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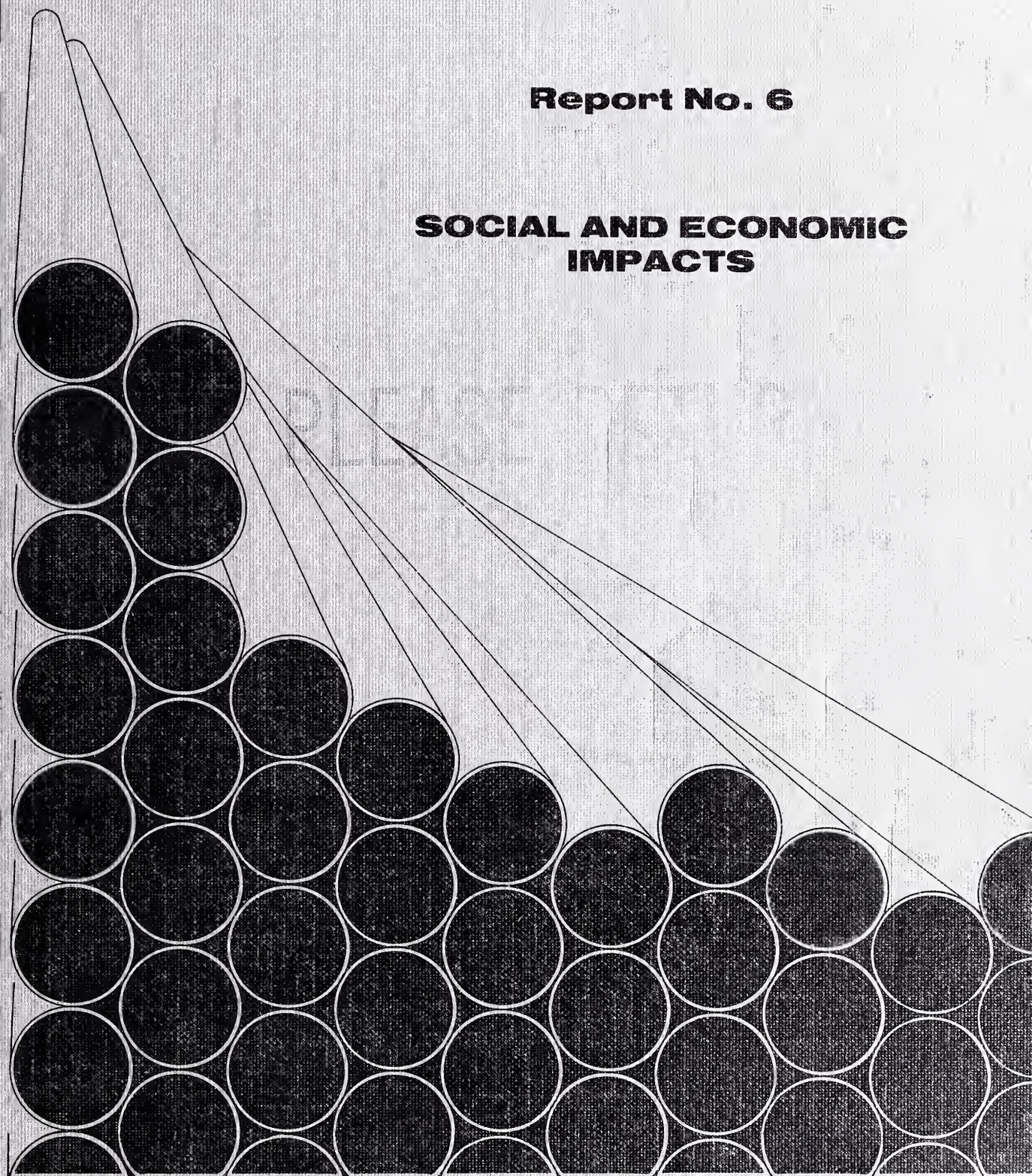
Report No. 6

SOCIAL AND ECONOMIC IMPACTS



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Northern Tier Report No. 6

SOCIAL AND ECONOMIC IMPACTS OF THE PROPOSED NORTHERN TIER PIPELINE IN MONTANA

PLEASE RETURN

by

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Montana Department of Natural Resources and Conservation

Energy Division

In Consultation with Mountain West Research, Inc.

Billings, Montana

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Peggy Todd and Dave Lambert, Editors

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ABBREVIATIONS

BLM	Bureau of Land Management
bpd	barrels per day
cm	centimeter
DNRC	Department of Natural Resources and Conservation (Montana)
DOE	Department of Energy
EIS	environmental impact statement
FERC	Federal Energy Regulatory Commission
ft	foot
ha	hectare
in	inch
km	kilometer
m	meter
mi	mile
NTPC	Northern Tier Pipeline Company
NTPS	Northern Tier Pipeline System
OSHA	Office of Safety and Health Administration
USDA	United States Department of Agriculture
USDI	United States Department of Interior
yr	year

ACKNOWLEDGEMENTS

Northern Tier Pipeline Company funded studies of the impacts of the proposed Northern Tier Pipeline on socioeconomic factors. This report was prepared by Larry Nordell of the Montana Department of Natural Resources and Conservation, Energy Division, and by Mountain West Research, Inc.

Editors were Dave Lambert and Peggy Todd; layout was coordinated by Don Breiby and Gary Wolf; the report was typed by Pam Goddard, Marci Curtis, and Patty Hallberg; Lee Shelton compiled the literature citations and made the metric conversions. June Virag provided assistance with graphics and illustrations.

CHAPTER ONE

INTRODUCTION

The following analysis of the effects of a large-diameter underground pipeline on social and economic concerns supplements the state's Draft EIS on the Proposed Northern Tier Pipeline System, prepared by the Department of Natural Resources and Conservation (DNRC). The Northern Tier Pipeline Company (NTPC) has proposed a 102- to 107-cm-diameter (40- to 42-in-diameter) underground pipeline system to transport crude oil from a tanker port at Port Angeles, Washington, to Clearbrook, Minnesota, traversing approximately 1014 km (630 mi) of Montana en route.

The state's draft EIS discusses the impacts of Northern Tier's proposed route and alternative routes. The U.S. Bureau of Land Management (BLM) has also prepared a draft EIS on the proposed project (USDI 1979).

This report (1) gives a general description of large-diameter, underground, crude oil pipelines (such as the proposed Northern Tier Pipeline System, or NTPS), (2) discusses social and economic impacts from construction, operation and maintenance, and abandonment of such a pipeline, and (3) identifies possible mitigation measures. While the report emphasizes socioeconomic effects in Montana, the information is generally applicable to study of the impacts a large, underground pipeline would have in other parts of the country where those effects might be similar to those in Montana.

This report is one in a series of six reports prepared in conjunction with the state's draft EIS. The series consists of the following reports:

Report 1 The Effects of Large-Diameter Underground Crude Oil Pipelines on Soils and Vegetation, with Emphasis on the Proposed Northern Tier Pipeline in Montana

Report 2 The Effects of Large-Diameter Underground Crude Oil Pipelines on Wildlife, with Emphasis on the Proposed Northern Tier Pipeline in Montana

Report 3 The Effects of Large-Diameter Underground Crude Oil Pipelines on Aquatic Life and Habitats, with Emphasis on the Proposed Northern Tier Pipeline in Montana

Report 4 Earthquake Hazard to the Proposed Northern Tier Pipeline in Montana

Report 5 The Effects of Large-Diameter Underground Crude Oil Pipelines on Land Use, with Emphasis on the Proposed Northern Tier Pipeline in Montana

Report 6 Social and Economic Impacts of the Proposed Northern Tier Pipeline in Montana

The reports are available on request from the Montana Department of Natural Resources and Conservation, Energy Division, 32 South Ewing, Helena, Montana 59601, (406) 449-3780.

CHAPTER TWO

A GENERAL DESCRIPTION OF LARGE-DIAMETER UNDERGROUND, CRUDE-OIL PIPELINES

The following is a summary of the activities typically required to construct, operate and maintain, and abandon a large-diameter, underground, crude oil pipeline system. More detailed discussions of pipeline system design and techniques of constructing, operating, and maintaining a pipeline are in the sections of DNRC's draft EIS titled "Description of the Proposed Action" and "Engineering."

SUMMARY OF ACTIVITIES

PIPELINE CONSTRUCTION

The construction of a large-diameter pipeline system would involve the following activities:

1) Survey flights over the pipeline route prior to construction

2) Surveying and staking the centerline

3) Clearing vegetation from the construction right-of-way

4) Excavating the pipeline trench

5) Transporting pipe to the trench, welding pipe sections and wrapping pipe with a protective cover (pipe staging)

6) Laying the pipe and backfilling

7) Constructing crossings where a pipeline intersected rivers, streams, canals, roads, utility lines, and other pipelines

8) Testing the soundness of the pipe (hydrostatic testing)

9) Reclaiming sites disturbed by construction

CONSTRUCTION OF FACILITIES ASSOCIATED WITH A PIPELINE

Facility construction would involve:

1) Establishing work camps for construction personnel where existing housing could not accommodate an influx of workers

2) Constructing access roads to the pipeline and associated facilities

3) Building pump stations and delivery facilities

4) Installing high-voltage electrical transmission lines serving pump stations and delivery facilities, and low-voltage distribution lines serving valves

5) Establishing storage yards for pipe and construction materials

6) Excavating material sites (such as gravel pits)

PIPELINE OPERATION AND MAINTENANCE

The following maintenance activities would take place during operation of a pipeline system:

1) Controlling growth of vegetation within the permanent right-of-way

2) Maintaining pump stations, delivery facilities, and powerlines

3) Maintaining access roads to the pipeline, pump stations, and delivery facilities

4) Making survey flights over the right-of-way

5) Controlling, containing, and cleaning up oil spills, and reclaiming spill areas

PIPELINE ABANDONMENT

The following activities would occur after completion of pipeline operation:

1) Flushing oil from the pipeline with water

2) Collecting and treating the water at wastewater treatment facilities, normally constructed at discharge sites

3) Possibly, removing pipe from the trench; this would involve many of the previously mentioned construction activities, including accommodating construction workers, clearing the right-of-way, excavating the pipeline trench, and reclaiming disturbed areas

ACTIVITIES THAT WOULD POSE THE GREATEST RISK OF IMPACT TO SOCIOECONOMIC CONCERNS

The construction of a large crude oil pipeline across the Northern Tier states will result in impacts to the socioeconomic structures of those states. Materials, equipment, and work forces will be moved along the route finally selected, subsequently producing both physical, social, and economic changes, some of which will be short-term. Other impacts will last for the duration of the pipeline.

It is the purpose of this report to present a detailed account of the socioeconomic effects of such a construction project on the state and on the counties and the communities along the route. The three principal factors affecting the extent of impact are the selection of one of the alternative routes, the work schedule, and the characteristics of the work force.

ALTERNATIVE ROUTES

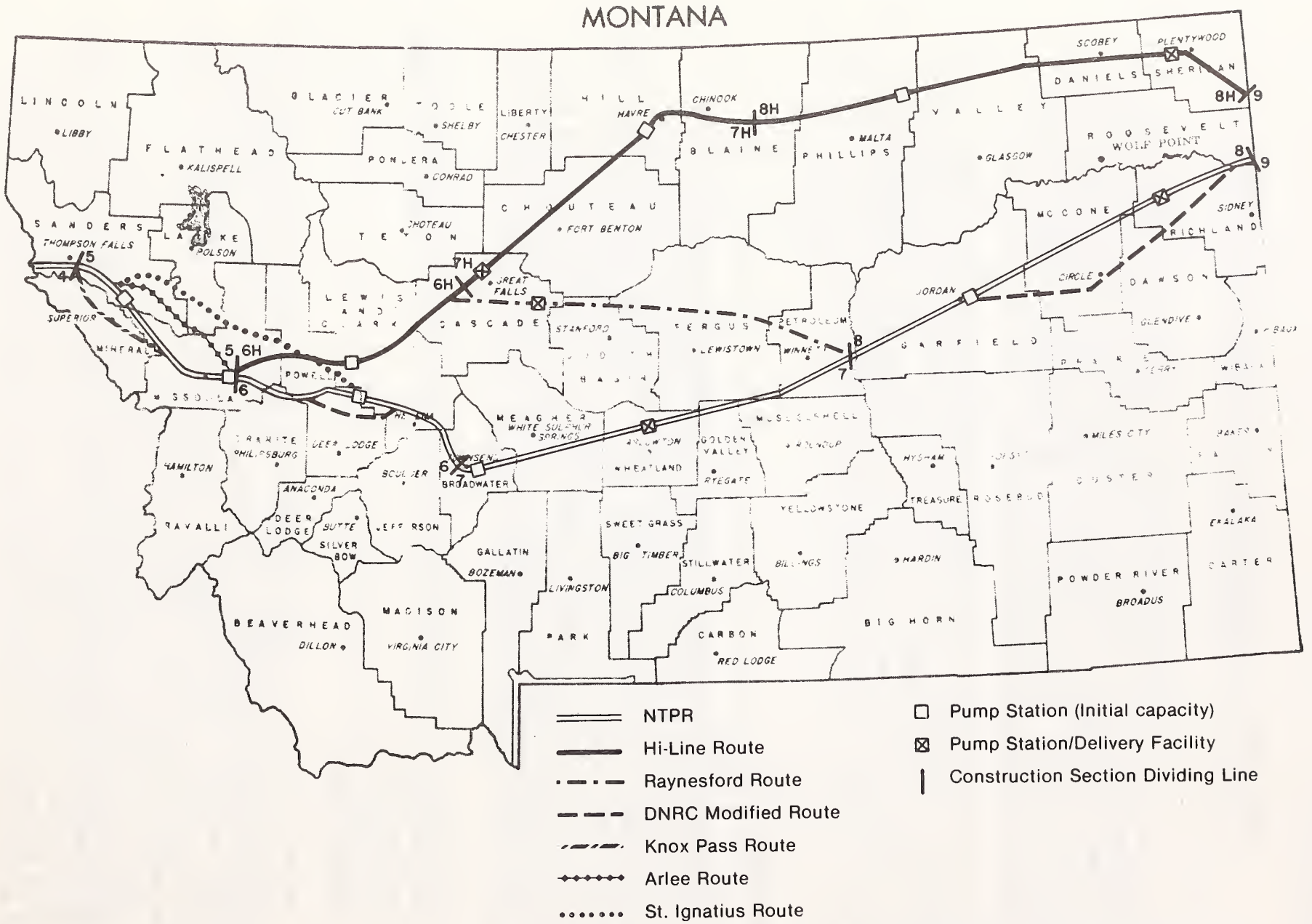
The Montana DNRC examined a number of alternative routes for the Northern Tier Pipeline Project, including four statewide alternatives (see figure 1): 1) the Proposed Route (NTPR) designated by the NTPC, 2) the DNRC Modified Route proposed by DNRC, 3) the Hi-Line Route proposed by Montana DNRC, and 4) the Raynesford Route, also proposed by DNRC. In addition, two alternatives between the Idaho border and Bonner east of Missoula have been proposed by DNRC: 1) the Arlee Route, and 2) the Knox Pass Route. Beyond these alternatives, the St. Ignatius Route originally proposed by NTPC is also included for purposes of comparison.

A description of the physical route of each alternative follows; the estimated lengths, pipeline sections, and facilities are presented in table form for each route.

NTPC Proposed Route

The Northern Tier Pipeline Company's Proposed Route (NTPR) is designated the company's preferred route (table 1). It enters Montana from Idaho at Thompson Pass, heads southeast past Helena to Townsend, turns due east to Harlowton, and then runs northeast to the North Dakota border near Fairview. The estimated length of this route is 1007 km (626 mi). Estimated section lengths used in this report are shown in table 1.

Seven pump stations would propel the oil along the NTPR. Two of these stations would be located at the intersections of the Northern Tier Pipeline with the Glacier and Western pipelines. The first would require construction of a delivery facility near Harlowton in Wheatland County and the second would require a similar facility near Richey in Richland County.



Mountain West Research, Inc.
May 1979

FIGURE 1.

Route Alternatives For The Northern Tier Pipeline: Montana

TABLE 1. Sections and facilities on the Northern Tier Pipeline Route.

Pipeline Sections	Facilities		
	No.	Station Type	Location
#4--The last 42 km (26 mi) from the Idaho border to a point about 11 km (7 mi) east of Thompson Falls	1N	Pump	Paradise, Sanders County
#5--From 11 km (7 mi) east of Thompson Falls to a point just west of Potomac; a total of 159 km (99 mi)	2N	Pump	Potomac, Missoula County
	3N	Pump	Helmville, Powell County
#6--From just west of Potomac, via Nine Mile Creek, north of Helena to a point roughly 19 km (12 mi) north of Townsend; a total of 189 km (117 mi)	4N	Pump	Townsend, Broadwater County
	5N	Pump and Delivery to Glacier Pipeline	Harlowton, Wheatland County
#7--From north of Townsend via Martinsdale and Harlowton to a point 8 km (5 mi) west of Mosby, just inside Petroleum County; a total of 293 km (182 mi)	6N	Pump	Jordan, Garfield County
#8--From west of Mosby, 324 km (202 mi) northeast to the North Dakota border about 24 km (15 mi) north of Fairview, Richland County.	7N	Pump and Delivery to Glacier Pipeline	40 km (25 mi) NW of Sidney, Richland County

CONVERSIONS: 1 mi = 1.609 km

DNRC Modified Route

The DNRC Modified Route is similar to the NTPR route, eastward to the Granite-Powell county line where it swings southeast, parallels I-90 to Garrison, then follows the Little Blackfoot River before rejoining the NTPR near Elliston. It also diverges from the NTPR at Jordan, passing to the south along State Highway 200 through Circle and Richey. It rejoins the NTPR just before the Missouri River crossing. The estimated length in Montana is 1017 km (632 mi).

The facilities locations on the DNRC Modified Route are the same as those on the NTPR with the exception of the western delivery facility/pump station complex that will be located northeast of Enid. The section lengths of the two alternatives shown in table 2 summarize the principal physical differences between them.

TABLE 2. Section lengths of NTPR and DNRC Modified routes (km).

Section No.	NTPR[1]	Modified[1]
4 (Montana portion)	42	42
5	159.1	164.4
6	188.6	192.5
7	293.1	296
8	324.2	322.2
Total	1,007.0	1,017.1

CONVERSIONS: 1 mi = 1.609 km

[1]Information furnished in the DPA (NTPC 1978a) shows Section 8 ending near Williston in North Dakota. It is now expected that this section will end at the Montana-North Dakota border.

Hi-Line Route

The Hi-Line route (table 3) proposed by DNRC for evaluation follows the NTPR from the Idaho border to Rainbow Bend, near Missoula, where it swings northeast via Ovando and Lincoln to Great Falls. From Great Falls, the route continues northeast to Havre, where it heads due east to Plentywood in Sheridan County before turning southeast to the North Dakota border. The total length of this route is 996 km (619 mi) and it includes nine pump stations, two of which are designed for later construction (estimated at 1984) to enable the system to reach full capacity. On this route, intersection with the Glacier and Western pipelines would occur near Great Falls and Plentywood, respectively. Delivery facilities would be constructed at both locations.

The route is one of two major alternatives identified by DNRC. Pump station and delivery facility locations in table 3 were established by DNRC with the assistance of Gulf Interstate Engineering.

TABLE 3. Sections and facilities on the Hi-Line route.

Pipeline Sections	Facilities		
	No.	Station Type	Location
#4--Same as NTPR	1H	Pump	Plains, Sanders County
#5--Same as NTPR	2H	Pump	Bonner, Missoula County
#6H--From just west of Potomac via Ovando and Lincoln to a point about 16 km (10 mi) SW of Great Falls; a total of 188 km (117 mi)	3H	Pump	32 km (20 mi) NE of Ovando, in Lewis & Clark County
#7H--From SW of Great Falls NE to Havre and then east via Chinook to a point just east of Harlem; a total of 270 km (168 mi)	4H	Pump and Delivery to Glacier Facility	Great Falls
#8H--From Harlem, 337 km (209 mi) to the North Dakota border via Scobey, Plentywood, and Dagmar	5H	Pump	S of Havre, Hill County
	6H	Pump	Harlem, Blaine County (ultimate phase)
	7	Pump	N of Saco, Phillips County
	8	Pump	S of Opheim, Valley County (ultimate phase)
	9	Pump and Delivery to Western Pipeline	24 km (15 mi) W of Plentywood, Sheridan County

NOTE: These distances are horizontal and thus understate the true length of a pipeline along these routes. Like all other route lengths used in this analysis, they are derived from DNRC land use tabulations.

Raynesford Route

The Raynesford Route (table 4) follows the NTPR to Potomac and the Hi-Line to south of Great Falls, near Cascade, where it turns eastward, passing through Denton in Fergus County and north of Lewistown. It rejoins the NTPR near Mosby in Garfield County. The route's total length would be 997 km (619 mi). Initially, six pump stations would be constructed along the route. Delivery facilities would be located at two of these stations (at the intersection with the Glacier line east of Great Falls and at the intersection with the Western line northwest of Richey). One additional pump station would have to be constructed in Petroleum County for the system to reach ultimate capacity (933,000 bpd).

This route (table 4) is the other DNRC-designated alternative. It shares sections #4, #5, and #8 with the NTPR, and most of section #6 with the Hi-Line Route.

TABLE 4. Sections and facilities on the Raynesford Route.

Pipeline Sections	Facilities		
	No.	Station Type	Location
#7--From south of Great Falls on the Hi-Line via Denton to intersect with the NTPR just west of Mosby; a total of 290 km (180 mi)	4L	Pump and Delivery to Glacier Pipeline	40 km (25 mi) SE of Great Falls
	5L	Pump	N of Winnett, Petroleum County (ultimate phase)

Arlee and Knox Pass Routes

Two shorter alternatives are under review by DNRC to determine the most environmentally desirable route from Thompson Pass on the Idaho border to Bonner, just east of Missoula. These alternatives are the Arlee and Knox Pass routes. The Arlee Route (table 5) totals about 187 km (116 mi) from the Idaho border to Bonner. It follows the DNRC Modified/NTPC routes from Thompson Pass to a point roughly 4.8 km (3 mi) northwest of Plains, turns northeast for about 14 km (9 mi), before crossing into the Flathead Reservation and then runs southeast via Perma and Dixon to Arlee, where it turns south to intersect the DNRC/NTPC routes just northwest of Missoula.

TABLE 5. Sections and Facilities on the Arlee Route.

Pipeline Sections	Facilities		
	No.	Station Type	Location
#4--As on the NTPR	1S	Pump	N of Plains, Sanders County
#5--From 11 km (7 mi) east of Thompson Falls to a point about 4.8 km (3 mi) due south of Potomac in Missoula County; a total of 169 km (105 mi)	1A	Pump	Arlee, Lake County

Knox Pass Route

This route segment (table 6) is 197 km (121 mi) long from Thompson Falls to Bonner. It proceeds from Thompson Falls southeast over Knox Pass to St. Regis and Superior in Mineral County. From St. Regis, the route parallels the interstate highway through Superior and Alberton; it rejoins the NTPC Proposed/DNRC routes just north of Frenchtown.

TABLE 6. Sections and Facilities on the Knox Pass Route.

Pipeline Sections	Facilities		
	No.	Station Type	Location
#4K--As on the NTPR to just before Thompson Falls, then southeast to Knox Pass; a total distance of 42 km (26 mi)	1K	Pump	Thompson Falls
	2K	Pump	Near Alberton (ultimate phase)
#5K--From Knox Pass to a point 3 miles due south of Potomac in Missoula County, via St. Regis, Superior, Frenchtown, Missoula, and Bonner; a total distance of 177 km (110 mi)			

St. Ignatius Route

Beyond these alternatives, the NTPC had originally proposed a route from Thompson Pass through the Flathead Reservation to Helena. Due to opposition to the project on the reservation, this route is not being considered. It has, however, been retained in the environmental impact analysis for purposes of comparison. This route, called the St. Ignatius

Route, has an estimated length of 993 km (617 mi). The St. Ignatius Route (table 7) departs from the present NTPR just west of Plains, crosses the Flathead Reservation, passes near St. Ignatius, and rejoins the NTPR about 9.5 km (6 mi) east of Helmville in Powell County.

TABLE 7. Sections and Facilities on the St. Ignatius Route.

Pipeline Sections	Facilities		
	No.	Station Type	Location
#4--As on the NTPR	1S	Pump	N of Plains, Sanders County
#5S--From 11 km (7 mi) east of Thompson Falls to about 19 km (12 mi) west of Ovando; a total distance of about 160 km (99 mi)	2S	Pump	E of St. Ignatius, Lake County
	3S	Pump	On Lake-Missoula County border, Missoula side
#6S--From 19 km (12 mi) west of Ovando to about 26 km (16 mi) NW of Townsend; a total distance of 174 km (108 mi)	4S	Pump	Near Elliston, Powell County

WORK SCHEDULE

Each of the route alternatives would be divided into lengths called sections, with a single prime contractor responsible for construction on each section. Construction of all sections would take place simultaneously, beginning at the westernmost point of each section and moving eastward. Construction of the pipeline in Montana would involve part of one section (number 4) and all of four others (numbers 5-8).

Construction of the pipeline will require approximately 2,300 workers, supervisors, and inspectors; another 250 (on the average) will be engaged in the construction of pump stations and delivery facilities. Permanent employment, directly from operation of the pipeline, will total 48 jobs in Montana.

As scheduled, construction of each of the Montana sections would take about eight months, delivery facilities about fourteen months, and pump stations about ten months.

The cost to construct the Northern Tier Pipeline in Montana was estimated in 1978 at about $400 million. The Raynesford Route would be the least costly alternative at around $393 million, while the DNRC Modified Route would be the most costly at approximately $408 million. Given the usual errors in estimating costs on a project of this size, these differences are probably not statistically significant. Between the Idaho border and Bonner,

the NTPR would be 2.7 percent cheaper than the next least costly alternative (DNRC Modified Route), while the Knox Pass Route, at $94.3 million, would be the most expensive. Construction costs by county are shown in tables 8 through 13.

Information in tables 14 and 15 include a comparison of section lengths, number of pump stations, and investment costs in terms of capacity.

Construction Schedule

The schedule of construction activities determines what effects those activities will have on the socioeconomic situation along the pipeline route. It influences demands for lodging, food and services, impacts on the educational systems, and to some extent, the composition of the work force itself.

Construction of the pipeline sections will begin simultaneously at the western ends and proceed eastward. Construction crews on adjacent sections will not be in the same locale at the same time. Construction of the fixed-site facilities (pump stations and delivery facilities) will take place at the same time as construction of the pipeline sections. Overlap between section and facility construction work forces is inevitable.

Figure 2 shows NTPC's proposed scheduling of pipeline construction activities in Montana (NTPC 1978d). Work on the pipeline sections, the pump stations, and the delivery facilities would start in March 1980, following preparatory steps in February. Construction activity would then be continuous with both the pipeline and the pump stations completed by the end of November 1980, while work on the delivery facilities would be completed by May 1981. This proposed schedule assumes there are neither delays in startup nor delays due to inclement weather. Either of these factors could result in construction activities on the spread being extended over into a second construction season.

In Montana, construction of the pipeline will be organized by two components -- section and facility. The major construction components of each alternative are briefly described on the following pages.

Construction Work Rates

The average work rates on the sections in Montana were estimated by dividing total section length by the forecast construction period (245 days). The rates vary from about 4.5 km/wk (2.8 mi/wk) on the more difficult section 5 in western Montana to nearly 10 km/wk on the Hi-Line's section 8H in the northeastern part of the state. The exception is the clearing activity which on sections in easier terrain could progress roughly twice as fast as the spread. This means that on section 8, for example, the eastern end could be cleared by month 4-5, but would not be constructed until month 8-9. In the progress of work along the alignment, the clearing crew is assumed to be resident with the main body of pipeline construction workers before locating ahead during months 3-4. Under prevailing conditions in eastern Montana, the clearing and grubbing could be completed after only four months' work.

TABLE 8. Estimated Construction Costs by County[1] (1978 dollars)

NTPR[2]

County	Pipeline Length Km	Pipeline Length Mi	Estimated Construction Costs - $000 Pipeline	Pump Stations/ Delivery Facilities Phase I	Phase II	Total Costs (1985)
Sanders	101.3	63.0	$ 49,945	$ 3,461	$ 233	$ 53,639
Missoula	113.2	70.4	47,994	7,364		55,358
Granite	22.9	14.2	9,387			9,387
Powell	72.3	44.9	26,972	2,886		29,858
Lewis & Clark	50.6	31.4	20,524			20,524
Jefferson	2.4	1.5	1,148			1,148
Broadwater	70.4	43.8	25,853	3,346	167	29,366
Meagher	68.2	42.4	23,249			23,249
Wheatland	67.8	42.1	23,628	11,296	291	35,215
Golden Valley	29.9	18.6	9,356			9,356
Musselshell	26.9	16.7	8,489			8,489
Fergus	4.1	2.6	1,291			1,291
Petroleum	57.8	35.9	19,302			19,302
Garfield	134.2	83.4	39,600	1,528	2,556	43,684
McCone	88.9	55.2	25,908			25,908
Dawson	2.4	1.5	682			682
Richland	88.6	55.1	25,708	9,145	523	35,376
Roosevelt	5.1	3.2	1,936			1,936
TOTAL	1007.0	625.8	$360,972	$39,026	$ 3,770	$403,768

CONVERSIONS: 1 mi = 1.609 km

[1]The pipeline is 107 cm (42 in) in diameter from Sanders County to Wheatland County, where it changes to 102 cm (40 in) pipe for the last 9.4 km (15 mi) of Wheatland County and the remainder of the route.

[2]NTPC 1979b provides the investment costs. Lengths are based upon DNRC land use totals and result in a total length of 6 km shorter than Butler Associates' estimates.

TABLE 9. Estimated Construction Costs by County[1] (1978 dollars)

DNRC Modified Route[2]

County	Pipeline Length Km	Pipeline Length Mi	Estimated Construction Costs - $000 Pipeline	Pump Stations/ Delivery Facilities Phase I	Phase II	Total Costs (1985)
Sanders	101.7	63.2	$ 50,142	$ 3,461	$ 233	$ 53,836
Missoula	118.2	73.5	50,114	7,364		57,478
Granite	43.9	27.3	17,995			17,995
Powell	55.8	34.7	20,817	2,886		23,703
Lewis & Clark	49.9	31.0	20,240			20,240
Jefferson	2.4	1.5	1,148			1,148
Broadwater	70.4	43.8	25,853	3,346	167	29,366
Meagher	68.2	42.4	23,249			23,249
Wheatland	67.6	42.1	23,628	11,296	291	35,215
Golden Valley	29.9	18.6	9,356			9,356
Musselshell	26.9	16.7	8,489			8,489
Fergus	4.1	2.6	1,291			1,291
Petroleum	57.6	35.8	19,235			19,235
Garfield	138.1	85.8	40,751	1,528	2,556	44,835
McCone	62.0	38.5	18,069			18,069
Dawson	39.2	24.4	11,139			11,139
Richland	75.9	47.2	22,023	9,145	523	31,691
Roosevelt	5.1	3.2	1,936			1,936
TOTAL	1017.1	632.1	$365,475	$39,026	$ 3,770	$408,271

CONVERSIONS: 1 mi = 1.609 km

[1]The pipeline is 107 cm (42 in) in diameter from Sanders to Wheatland County, where it changes to 102 cm (40 in) pipe for the last 24.1 km (15 mi) Wheatland and the remainder of the route.

[2]Lengths based on DNRC land use totals, costs based on NTPR costs per kilometer per county.

TABLE 10. Estimated Construction Costs by County[1] (1978 dollars)

Hi-Line Route

County	Pipeline Length Km	Pipeline Length Mi	Estimated Construction Costs - $000 Pipeline	Pump Stations/ Delivery Facilities Phase I	Pump Stations/ Delivery Facilities Phase II	Total Costs (1985)
Sanders	101.7	63.2	$ 49,945	$ 3,239	$	$ 53,184
Missoula	130.2	80.9	53,912	8,862		62,774
Powell	38.1	23.7	16,557			16,557
Lewis & Clark	72.9	45.3	26,676	3,000		29,676
Cascade	87.3	54.2	30,560	11,234		41,794
Chouteau	108.1	67.2	35,946			35,946
Hill	53.6	33.3	15,841	1,895		17,736
Blaine	88.3	54.9	28,963	310	1,895	31,168
Phillips	83.3	51.8	24,241	4,890		29,131
Valley	88.6	55.1	25,312	315	1,895	27,522
Daniels	75.9	47.2	22,862			22,862
Sheridan	68.3	42.4	23,804	8,804		32,608
TOTAL	996.0	619.2	$354,620	$42,549	$ 3,790	$400,959

CONVERSIONS: 1 mi = 1.609 km

[1]The pipeline is 107 cm (42 in) in diameter from Sanders County to Cascade County, where it changes to a 102 cm (40 in) pipe for the last 21 km (13.2 mi) of Cascade County and the remainder of the route.

TABLE 11. Estimated Construction Costs by County[1] (1978 dollars)

Raynesford Route

County	Pipeline Length Km	Pipeline Length Mi	Estimated Construction Costs - $000 Pipeline	Pump Stations/ Delivery Facilities Phase I	Phase II	Total Costs (1985)
Sanders	101.7	63.2	$ 49,945	$ 3,461	$ 233	$ 53,639
Missoula	130.2	80.9	53,912	7,364		61,276
Powell	38.1	23.7	16,557			16,557
Lewis & Clark	72.9	45.3	26,676	3,000		29,777
Cascade	102.1	63.5	35,817	13,911		49,728
Judith Basin	50.5	31.4	17,065			17,065
Fergus	113.6	70.6	32,788			32,788
Petroleum	67.2	41.8	21,997	315	1,895	24,207
Garfield	138.1	85.8	40,751	1,528	2,556	44,835
McCone	62.0	38.5	18,069			18,069
Dawson	39.2	24.4	11,139			11,139
Richland	79.9	47.2	22,023	9,145	523	31,691
Roosevelt	5.1	3.2	1,936			1,936
TOTAL	996.6	619.4	$348,776	$38,724	$ 5,207	$392,707

CONVERSIONS: 1 mi = 1.609 km

[1]The pipeline is 107 cm (42 in) in diameter from Sanders County to Cascade County, where it changes to 102 cm (40 in) pipe for the last 13.5 km (8.4 mi) of Cascade County and the remainder of the route.

TABLE 12. Estimated Construction Costs by County[1] (1978 dollars)

Arlee and Knox Pass Routes

County	Pipeline Length Km	Pipeline Length Mi	Estimated Construction Costs - $000 Pipeline	Pump Stations/ Delivery Facilities Phase I	Phase II	Total Costs (1985)
Arlee[2]						
Sanders	137.6	85.5	$ 67,842	$ 3,461	$ 233	$ 71,536
Lake	14.4	9.0	6,105	1,443[4]		7,548
Missoula	72.0	44.8	30,526	7,364		37,890
TOTAL	224.0	139.3	$104,473	$12,268	$ 233	$116,974
Knox Pass[3]						
Sanders	42.4	26.4	$ 20,674	$ 1,443	$	$ 22,117
Mineral	99.0	61.5	48,822	350	1,443[4]	50,615
Missoula	91.3	56.7	38,709	7,364		46,073
TOTAL	232.7	144.6	$108,205	$ 9,157	$ 1,443	$118,805

CONVERSIONS: 1 mi = 1.609 km

[1]The pipeline is 107 cm (42 in) in diameter in these counties.

[2]Lengths provided by DNRC, construction cost per kilometer for Sanders County assumed equal to that of NTPC; for Lake and Missoula counties cost is assumed equal to that for Missoula County on the NTPR. Pump station costs assumed equal to those on NTPR.

[3]Lengths and construction costs provided by DNRC for Sanders and Mineral counties. Construction cost per kilometer in Missoula County assumed equal to the NTPR. Pump station in Missoula County assumed to be the same as on the NTPR.

[4]Assumed equal to Sanders County pump station on Knox Pass Route.

TABLE 13. Estimated Construction Cost by County[1] (1978 dollars)

St. Ignatius Route[2]

County	Pipeline Length Km	Pipeline Length Mi	Estimated Construction Costs - $000 Pipeline	Pump Stations/ Delivery Facilities Phase I	Phase II	Total Costs (1985)
Sanders	115.2	71.6	$ 56,798	$ 3,461[3]	$ 233[3]	$ 60,492
Lake	48.0	29.8	20,351	3,717[4]		24,068
Missoula	44.8	27.8	18,994	3,717[4]		22,711
Powell	88.0	54.7	32,829	2,886		35,715
Same as NTPR	697.3	433.4	226,674	25,315	3,370	255,526
TOTAL	993.3	617.3	$355,646	$39,096	$ 3,603	$398,512

CONVERSIONS: 1 mi = 1.609 km

[1]The pipeline is 107 cm (42 in) in diameter for these counties.

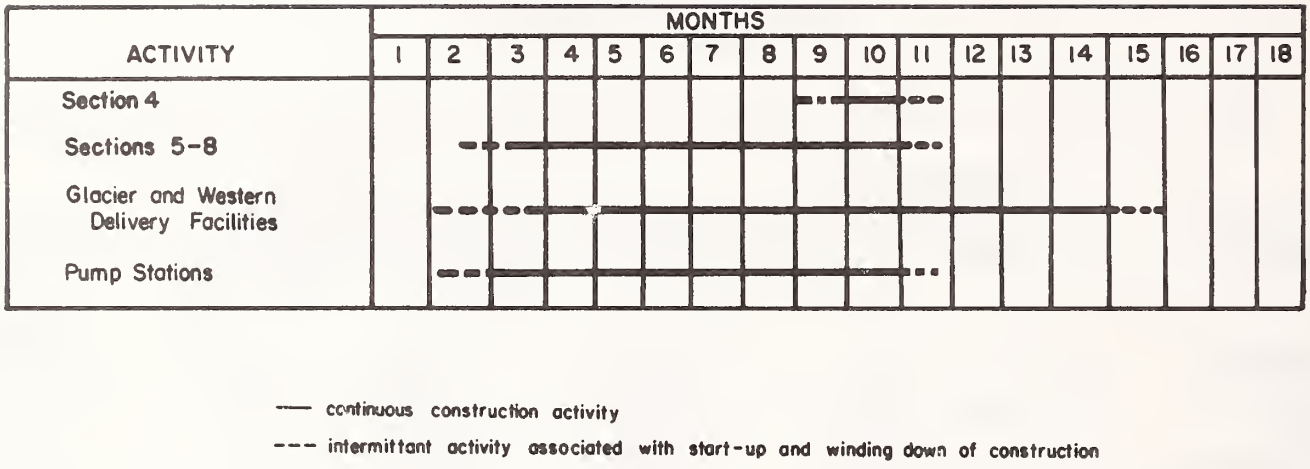
[2]County lengths taken from DNRC land use data. Pipeline costs based on construction cost per kilometer for the NTPR.

[3]Assumed equal to pump station costs on the NTPR.

[4]Assumed equal to the average of Phase I pump station costs on the NTPR.

FIGURE 2.

Proposed Construction Schedule[1]



[1]Source: Butler Associates, Memorandum-of-October 20, 1978. Schedule presumes continuous construction activity. Actual construction schedules will be developed by contractors awarded the work and may vary significantly from the estimate.

Using March 1, 1980 as the NTPC date forecast for the actual commencement of construction activities, and applying the average daily progress rates cited above, a hypothetical schedule of work progress along the alignment can be projected for each pipeline section and route alternative in Montana. Figures 3 to 8 summarize the resulting schedules.[1] When combined with the labor information provided below, these schedules make it possible to estimate impacts and their durations on communities along the right-of-way, for each route alternative, according to the proposed construction calendar.

WORK FORCE CHARACTERISTICS

This part of the report is concerned with how the process of building a pipeline affects socioeconomic conditions along the pipeline route. A brief description of construction scheduling and the disposition of the work force along the routes being considered should give perspective to the data presented here.

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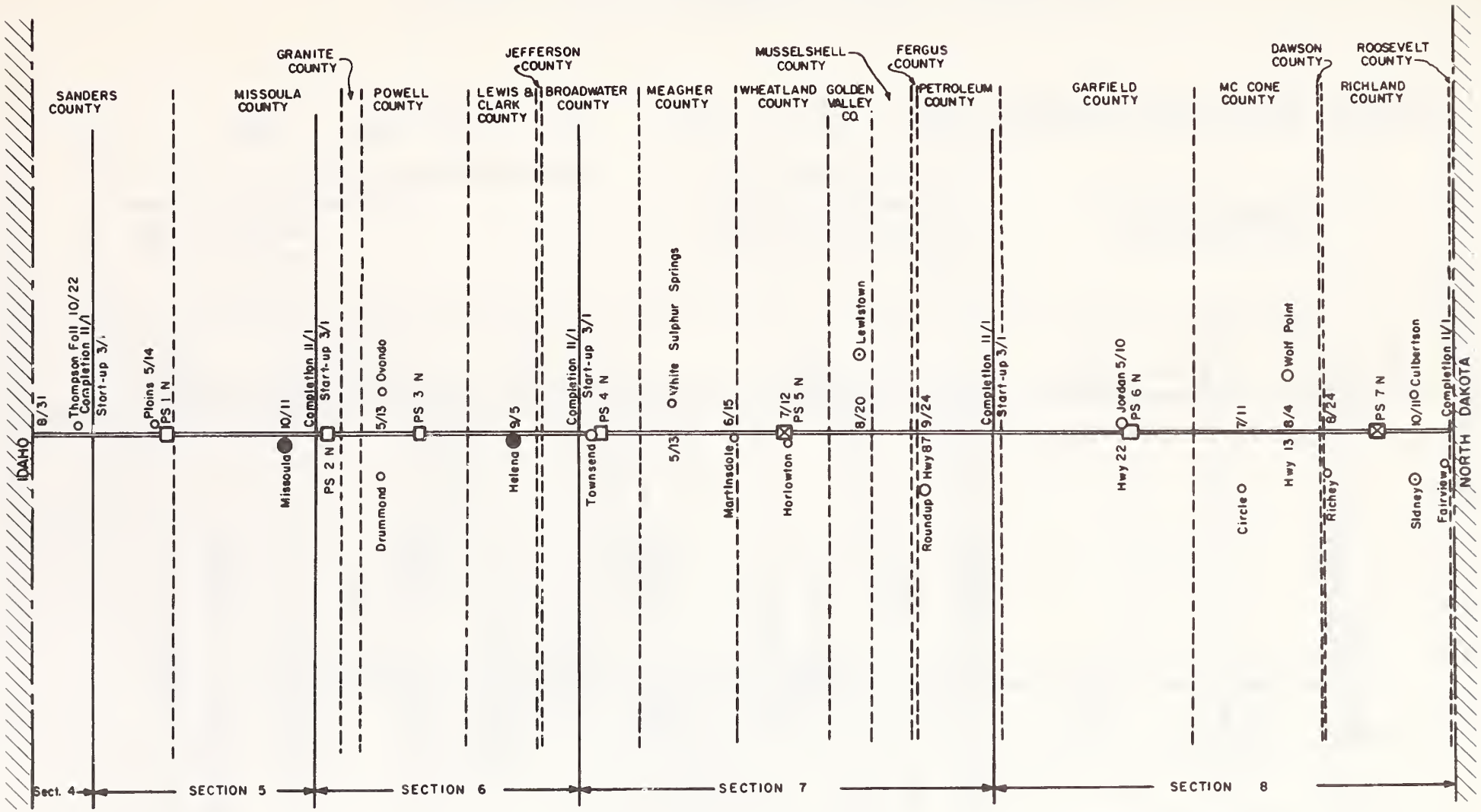
[1]The appendix contains summaries of the data and assumptions used to develop these schedules.

FIGURE 3.
ESTIMATED PIPELINE CONSTRUCTION SCHEDULE NTPR.



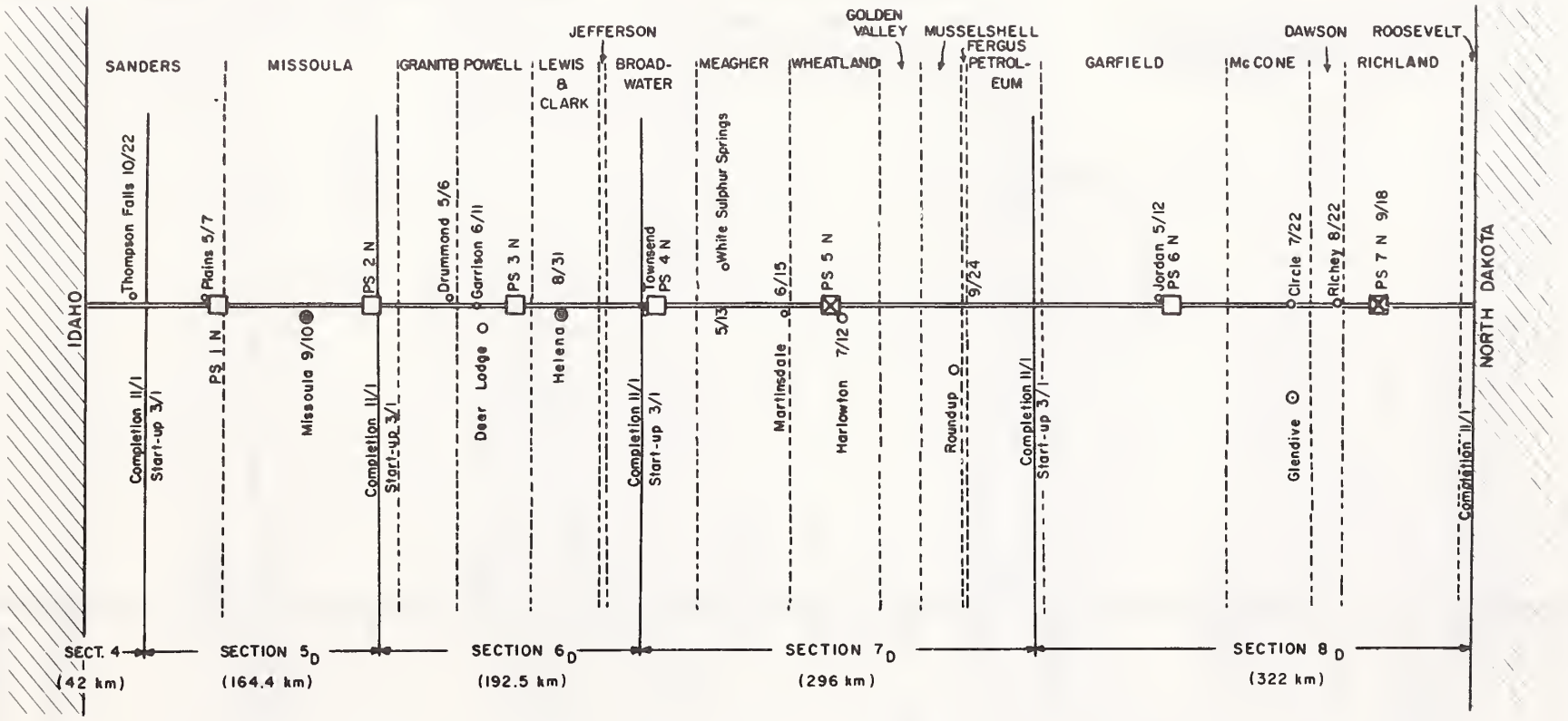
pipeline route
pump station
pump station/delivery facility
Plains 5/14 date middle of spread reaches a particular location

cities with population over 10,000
cities with population 2,000-10,000
cities with population 1,000-2,000
towns with population under 1,000

0 20 40 60 80 100 miles
0 50 100 150 200 kilometers

Mountain West Research, Inc. May 1979

FIGURE 4.
ESTIMATED PIPELINE CONSTRUCTION SCHEDULE DNRC MODIFIED ROUTE.



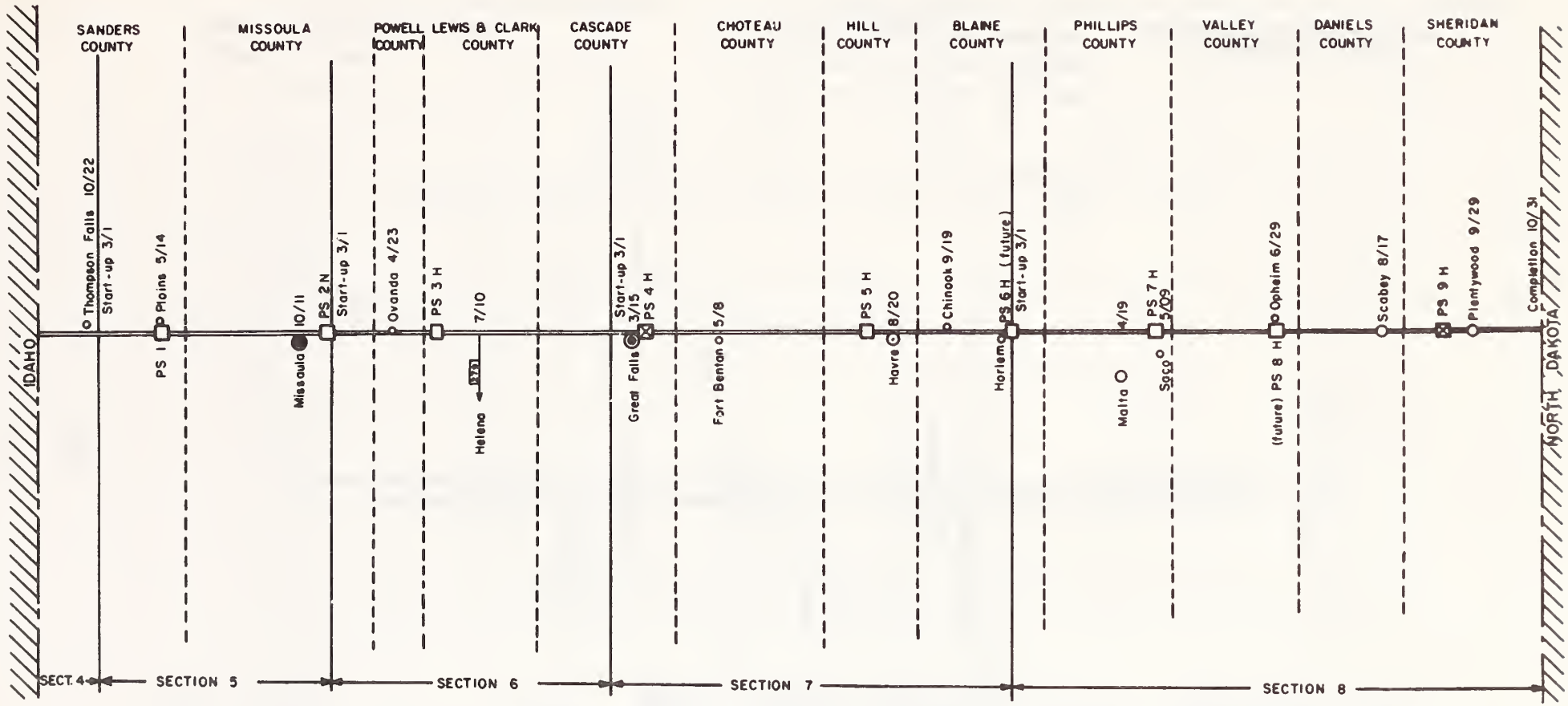
Note: Sections 5_D, 6_D, and 8_D are not in scale due to changes in their length made too late to be incorporated into the graphic.

- pipeline route
- pump station
- pump station/delivery facility
- Plains 5/14 — date middle of spread reaches a particular location
- ◉ cities with population over 10,000
- ⊙ cities with population 2,000-10,000
- O cities with population 1,000-2,000
- o towns with population under 1,000

0 10 20 30 40 50 miles
0 20 40 60 80 100 kilometers

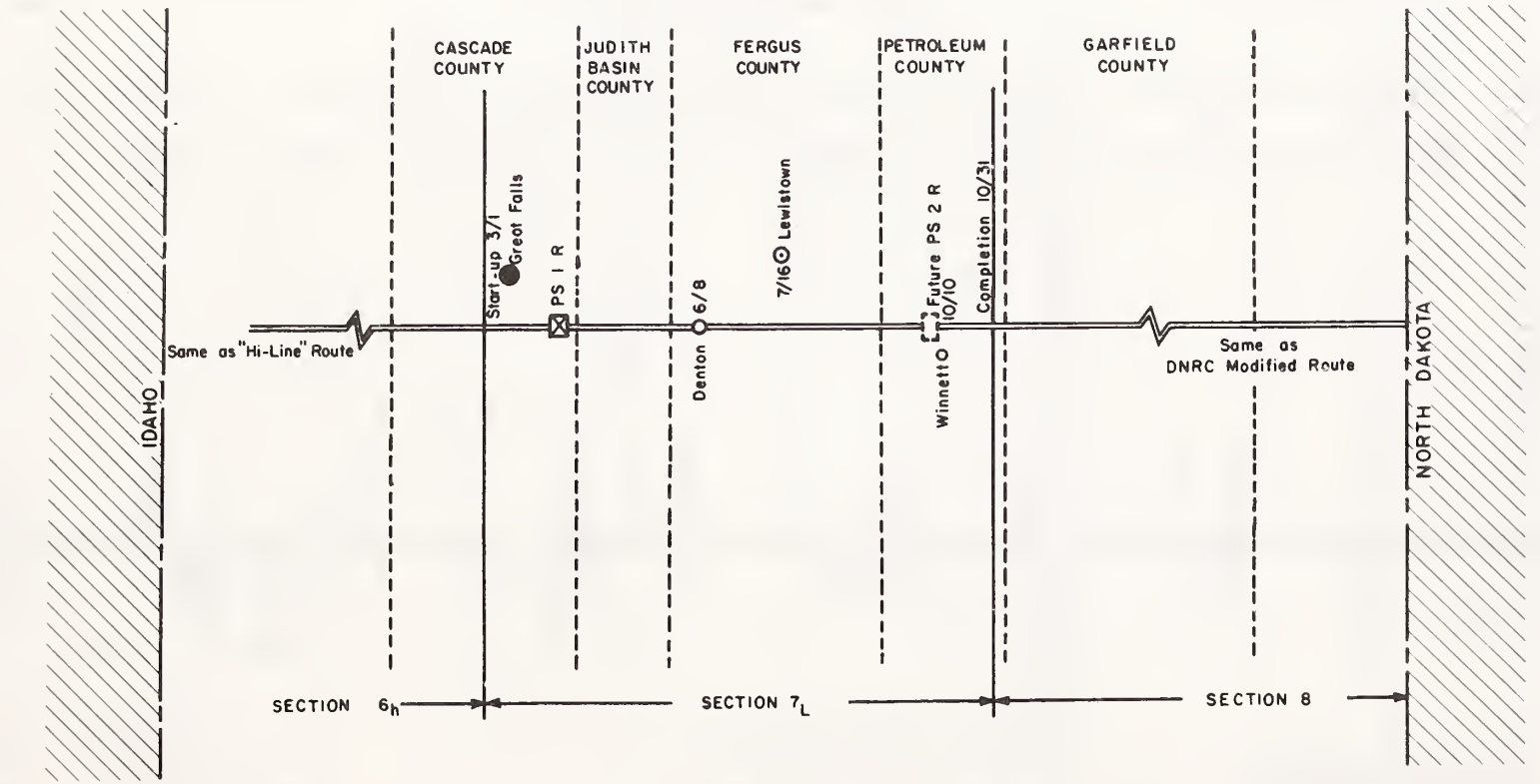
Mountain West Research, Inc. May 1979

FIGURE 5.
ESTIMATED PIPELINE CONSTRUCTION SCHEDULE HI-LINE ROUTE.



Mountain West Research, Inc. May 1979

FIGURE 6.
ESTIMATED PIPELINE CONSTRUCTION SCHEDULE, RAYNESFORD ROUTE.



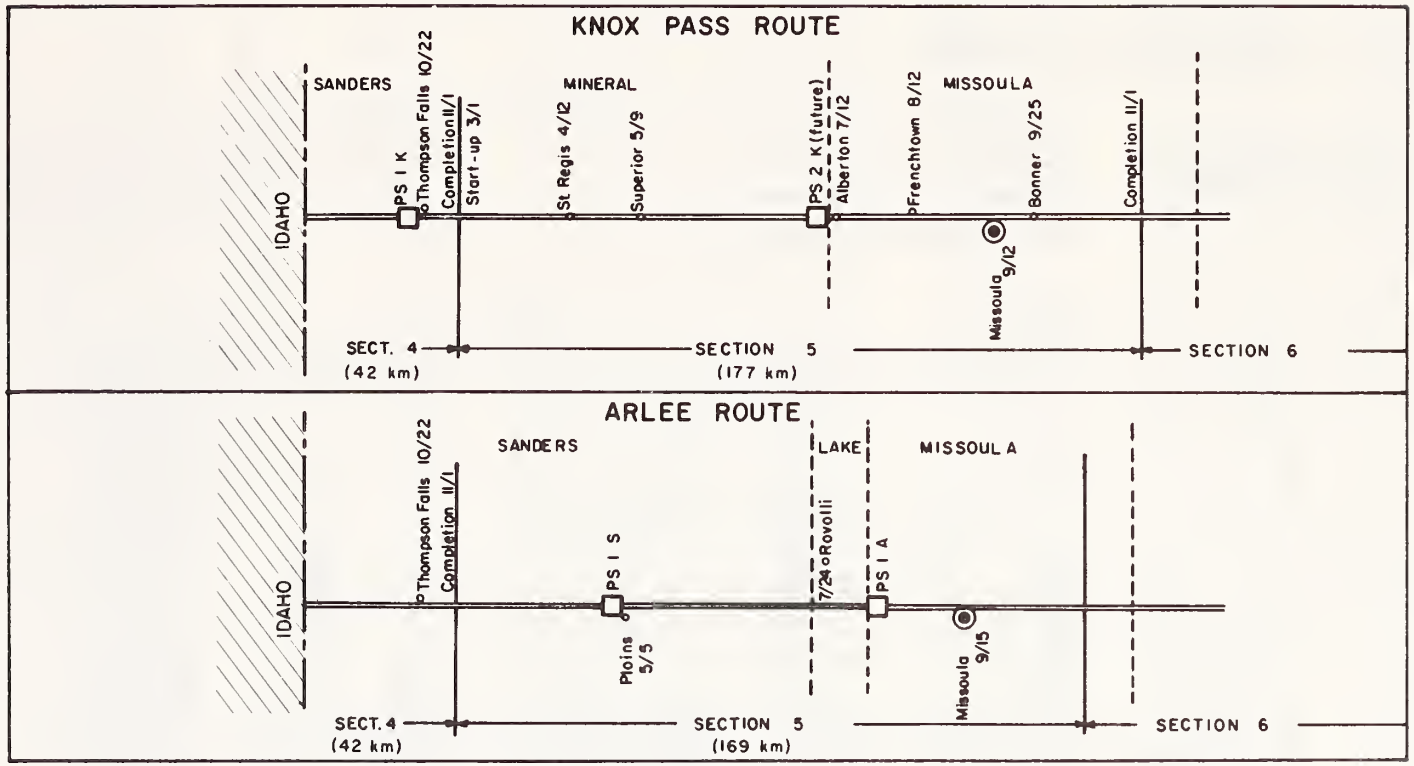
pipeline route
pump station
pump station/delivery facility
Plains 5/14 date middle of spread reaches a particular location

cities with population over 10,000
cities with population 2,000-10,000
cities with population 1,000-2,000
towns with population under 1,000

0 20 40 60 80 100 miles
0 50 100 150 200 kilometers

Mountain West Research, Inc. May 1979

FIGURE 7.
ESTIMATED PIPELINE CONSTRUCTION SCHEDULE, ARLEE AND KNOX PASS ROUTES.



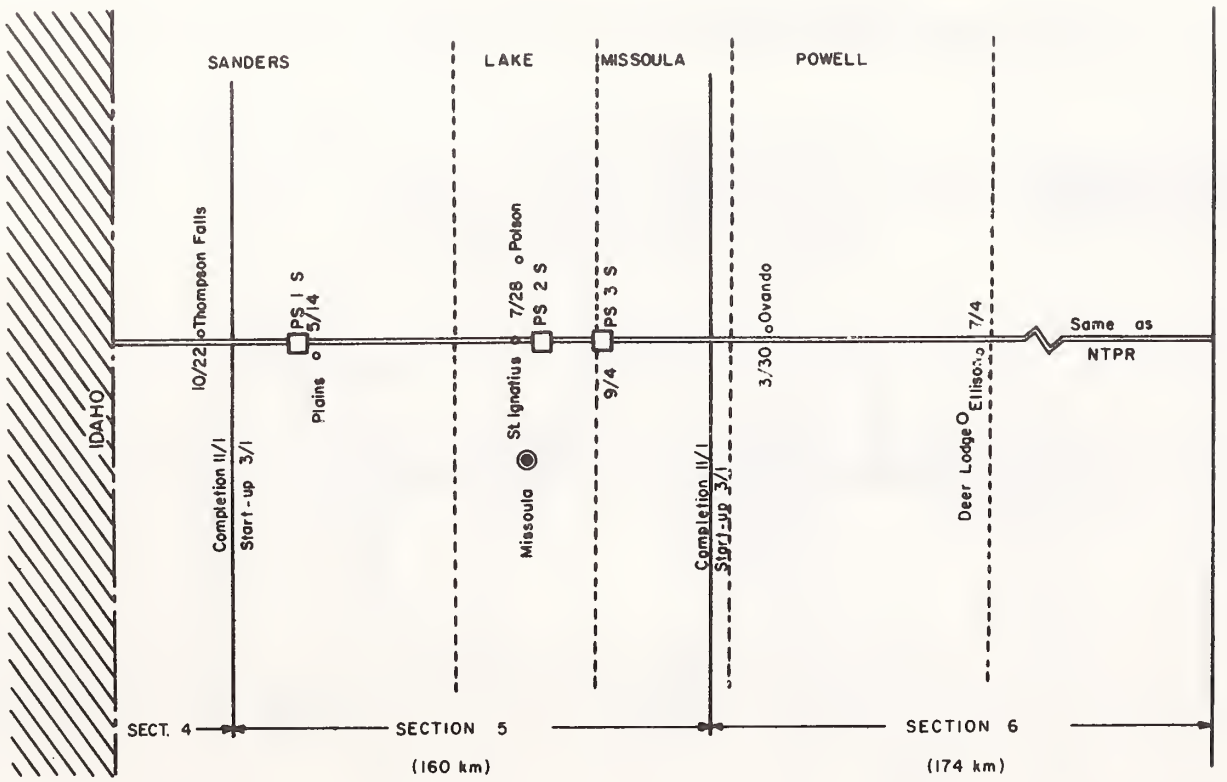
pipeline route
pump station
pump station/delivery facility
Plains 5/14 date middle of spread reaches a particular location

cities with population over 10,000
cities with population 2,000-10,000
cities with population 1,000-2,000
towns with population under 1,000

0 10 20 30 40 50 miles
0 20 40 60 80 100 kilometers

Mountain West Research, Inc. May 1979

FIGURE 8.
ESTIMATED PIPELINE CONSTRUCTION SCHEDULE, ST. IGNATIUS ROUTE.



pipeline route
pump station
pump station/delivery facility
Plains 5/14 date middle of spread reaches a particular location

cities with population over 10,000
cities with population 2,000-10,000
cities with population 1,000-2,000
towns with population under 1,000

0 10 20 30 40 50 miles
0 20 40 60 80 100 kilometers

Mountain West Research, Inc. May 1979

Construction proceeds along a right-of-way; that part where work is being done is called the "spread." Between stringing and cleanup, depending upon terrain and other factors, a construction spread may vary from 13 to 26 km (8 to 16 mi) in length. Except for the clearing and grading crew, (7 to 8 percent of the workforce) which generally progresses faster, the work force is concentrated at the construction spread.

The pace of the welding operation controls the progress of construction. All operations ahead of the welding are scheduled and staffed according to the features of the right-of-way (such as timber, rock, and excavation) to keep pace with the welding schedule. Operations following the welding are also staffed to maintain this rate of progress.

From the time that the clearing crews appear until the construction process is finished, hundreds of workers will have resided along the pipeline route. A few will remain to conduct the maintenance, operation, and finally, the abandonment of the pipeline. In Montana, fewer than 50 permanent employees are expected to take part in the maintenance and operation phase.

The effect that the pipeline construction would have on the socioeconomic structure of communities along the pipeline route is as transitory as the construction process itself. In this context, detrimental effects of the influx of pipeline workers appear to be minimal. Most of the benefits to communities as a result of pipeline construction would come from expenditures made by the workforce, not from employment of locals, because the nonlocal share of the labor force would be higher than in other kinds of major construction projects, such as power plants. This is due to the number of highly specialized workers needed, and the nature of labor agreements on the pipeline project between the international unions and the pipeline contractors.

Impacts that affect social and economic concerns will, of course, differ with the routes under consideration. The information presented on the alternative routes includes their relative lengths, costs, construction schedules, and work force numbers.

Construction Phase Labor Requirements

Altogether, initial phase construction of the Northern Tier Pipeline in Montana would require an estimated 16,735 person-months of labor for the NTPR and DNRC Modified routes. About 16,387 person-months would be required on the Hi-Line and Raynesford routes. The total labor requirements of the project would not be significantly different on the Arlee and Knox Pass alternatives.

According to the present construction schedule, over 2,000 persons would be employed on the project in the state during three peak labor months, May-June-July 1980. Tables 14 and 15 show routes, costs, and section lengths. Tables 16,17, and 18 present the estimated manpower schedule for each route alternative by major construction component and by month. They show that roughly 83 percent of the total labor force in Phase I will be engaged in the construction of pipeline sections. These tables are derived from the information and assumptions in the appendix.

TABLE 14. Route Alternatives Under Consideration

Route Alternative	Pipeline Length Km	Pipeline Length Mi	Number of Pump Stations Ultimate Phase	Investment Cost ($000)[1] Initital capacity(709,000 bd)	Investment Cost ($000)[1] Initial capacity(933,000 bd)
Statewide					
NTPR	1007	625.8	7	399,998	403,755
DNRC Modified	1017	632.1	7	404,501	408,271
Hi-Line	996.3	619.2	9	397,169	400,959
Raynesford	996.6	619.4	7	387,500	392,707
Idaho Border-Bonner					
Arlee	187.0	116.2	2	93,690	93,923
Knox Pass	195.7	121.6	2	94,311	95,754
NTPR	177.5	110.3	1	85,713	85,946
DNRC Modified	182.7	113.6	1	88,030	88,263
St. Ignatius (statewide)	993.0	617.3	7	394,909	398,512

CONVERSIONS: 1 mi = 1.609 km
1 barrel = 42 U.S. Gallons
1 barrel = .003785 m^3

[1]1978 dollars. Sources for cost data: NTPR and St. Ignatius route, Butler Associates, February 1979; DNRC Modified route, NTPR costs adjusted for length differences; all other route alternatives, DNRC 1979.

TABLE 15. Pipeline Construction Section Lengths by Route Alternatives (km).

Route Alternative	Section Number[1]					
	4[2]	5	6	7	8	TOTAL[3]
NTPR	42	159.1	188.6	293.1	324.3	1007.0
DNRC Modified	42	164.4	192.5	296.0	322.2	1017.0
Hi-Line	42	159.1	188.1	270.2	336.6	996.0
Raynesford	42	159.1	183.7	289.6	322.2	996.6
Arlee	42	169.0				211.0
Knox Pass	42	177.0				219.0
St. Ignatius	42	160.0	174.0	293.0	324.0	933.0

CONVERSIONS: 1 mi = 1.609 km

[1]Section lengths have been 1) defined by NTPC (St. Ignatius and NTPR) 2) approximately indicated on a small scale map by Jack Crank, engineering consultant to DNRC (Hi-Line and Raynesford Route) or 3) arbitrarily defined by Mountain West (DNRC Modified route, Arlee, and Knox Pass).

[2]Length in Montana.

[3]SOURCE: DNRC 1979. These distances represent horizontal length estimates for the routes and cannot be compared with NTPC route length estimates.

TABLE 16. Proposed Construction Manpower Schedule

NTPR and DNRC Modified Routes.

Facility/ Construction Section No.	Lenght of Section in Montana (km)	Man-power Base[1]	Manpower Schedule (person-months) Construction Months													Total Person-Months	Per-Cent of Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Glacier DF[2]			16	44	44	40	40	40	40	40	42	84	77	67	48	16	638	3.8
PS No. 16			8	12	27	44	42	34	19	22	22	7					237	1.4
Subtotal			24	56	71	84	82	74	59	62	64	91	77	67	48	16	875	5.2
Western DF			13	35	35	33	33	33	33	33	34	68	62	54	38	13	517	3.1
PS No. 18			8	12	27	44	42	34	19	22	22	7					237	1.4
Subtotal			21	47	62	77	75	67	52	55	56	75	62	54	38	13	754	4.5
PS Nos. 12-15 and 17 (each station)			40 (8)	60 (12)	135 (27)	220 (44)	210 (42)	180 (34)	95 (19)	110 (22)	110 (22)	35 (7)					1185 (237)	7.1 (1.4)
Facilities Subtotal			85	163	268	381	367	311	206	227	230	201	139	121	86	29	2814	16.8
Section 4	42.0	463								463	327	17					807	4.8
Section 5	159.0	463	22	239	463	463	463	463	463	463	327	17					3383	20.2
Section 6	188.6	463	22	239	463	463	463	463	463	463	327	17					3383	20.2
Section 7	293.1	463	22	239	463	463	463	430	430	430	327	15					3282	19.6
advance								33	33								66	(0.4)
Section 8	324.2	423	20	218	423	393	393	393	393	393	299	15					2940	17.6
advance						30	30										60	(0.4)
Sections Subtotal	1007.0	2210	86	935	1812	1812	1812	1782	1782	2212	1607	81					13,921	83.2
TOTAL			171	1098	2080	2193	2179	2054	1988	2439	1837	282	139	121	86	29	16,735	100.0

CONVERSIONS: 1 mi = 1.609 km

[1]Includes radiographic technicians (13) and NTPC inspectors (10)for each section. Does not include inspectors from state and federal agencies who may accompany the work force.

[2]Delivery Facility

TABLE 17. Proposed Construction Manpower Schedule

Hi-Line Route.

Facility/ Construction Section No.	Lenght of Section in Montana (km)	Man-power Base[1]	Manpower Schedule (person-months) Construction Months													Total Person-Months	Per-Cent of Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Glacier DF[2]			16	44	44	40	40	40	40	40	42	84	77	67	48	16	638	3.9
PS No. 4			8	12	27	44	42	34	19	22	22	7					237	1.4
Subtotal			24	56	71	84	82	74	59	62	64	91	77	67	48	16	875	5.3
Western DF			13	35	35	33	33	33	33	33	34	68	62	54	38	13	517	3.2
PS No. 9			8	12	27	44	42	34	19	22	22	7					237	1.4
Subtotal			21	47	62	77	75	67	52	55	56	75	62	54	38	13	754	4.6
PS Nos. 1-3, 5 and 7 (each station)			40 (8)	60 (12)	135 (27)	220 (44)	210 (42)	170 (34)	95 (19)	110 (22)	110 (22)	35 (7)					1185 (237)	7.2 (1.4)
Facilities Subtotal			85	163	268	381	367	311	206	227	230	201	139	121	86	29	2814	17.2
Section 4	26.1	463								463	327	17					807	4.9
Section 5	98.9	463	22	239	463	463	463	463	463	463	327	17					3383	20.6
Section 6H,	117	463	22	239	463	463	463	463	463	463	327	17					3383	20.6
Section 7H	168	423	20	218	408	393	393	393	393	393	299	15					2925	17.8
advance					15	30	30										75	0.5
Section 8H	225	423	20	218	401	393	393	393	393	393	299	15					2918	17.8
advance					22	30	30										82	0.5
Sections Subtotal	635	2235	84	914	1772	1772	1772	1712	1712	2175	1579	81					13,573	82.8
TOTAL			169	1077	2040	2153	2139	2023	1918	2402	1809	282	139	121	86	29	16,387	100.0

CONVERSIONS: 1 mi = 1.609 km

[1]Includes radiographic technicians (13) and NTPC inspectors (10) for each section. Does not include inspectors from state and federal agencies who may accompany the work force.

[2]Delivery Facility.

TABLE 18. Proposed Construction Manpower Schedule

Raynesford Route.

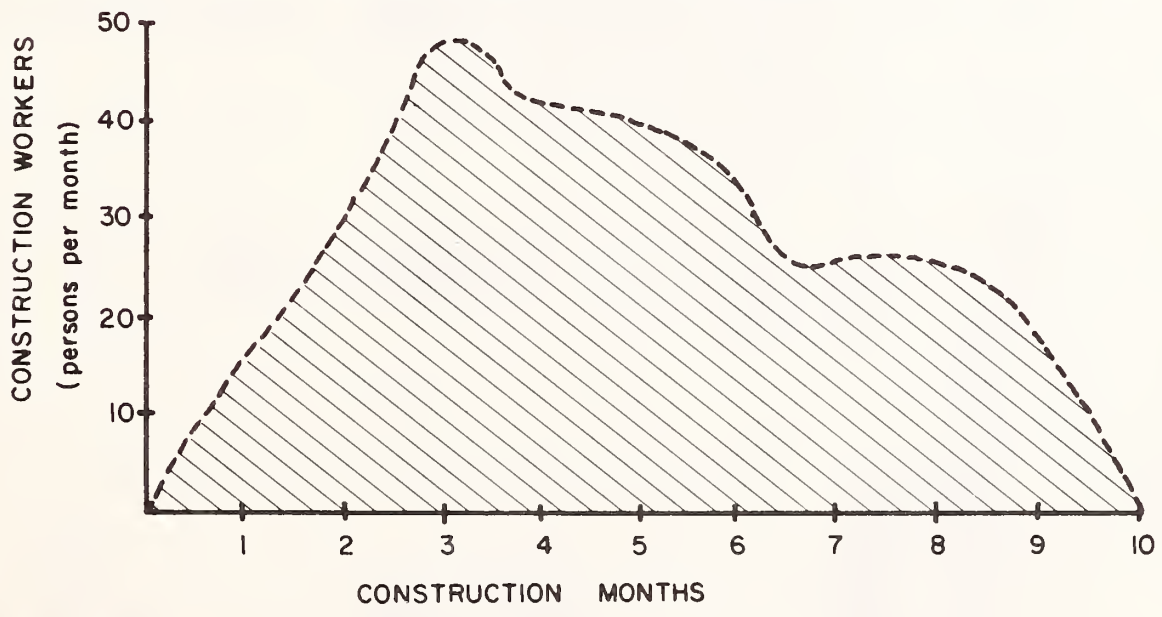
Facility/ Construction Section No.	Lenght of Section in Montana (km)	Man-power Basel	Manpower Schedule (person-months) Construction Months													Total Person-Months	Per-Cent of Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Glacier DF			16	44	44	40	40	40	40	40	42	84	77	67	48	16	638	
PS No. 4			8	12	27	44	42	34	19	22	22	7					237	
Subtotal			24	56	71	84	82	74	59	62	64	91	77	67	48	16	875	
Section 7	180 mi 280 km	423	20	218	408 15	393 30	393 30	393	393	393	299	15					2925 75	

Labor requirements by skill and month for the pipeline sections have been estimated and are presented in tables 19 and 20.[1] Peak labor requirements of approximately 463 persons (including NTPC inspectors, radiographic technicians and the clearing and grubbing crews) are anticipated over a six-month period on NTPR, DNRC, Hi-Line and St. Ignatius route sections 4, 5, and 6, while peak requirements of 423 persons are anticipated on NTPR and DNRC section 8, Hi-Line sections 7H and 8H, and Raynesford section 7L. The skills required by section construction activities are shown in table 21.

For the construction of pump stations, an estimated total of 236.5 person-months will be required--an average of nearly 24 person-months over the ten-month construction period. Figure 10 gives the manpower schedule for a typical pump station, assuming continuous construction. The actual manpower schedule may vary substantially, depending on the contractor. However, the forecast peak of 50 workers is a good index of maximum impact considering the sequence of construction activities. As figure 9 shows, this peak is a brief one of less than one-month duration, but a labor force of over 40 workers is likely for a 2-3 month period during months 3-6.

FIGURE 9.

ESTIMATED PUMP STATION MANPOWER
AND CONSTRUCTION SCHEDULE



[1]These are estimates derived from information provided to NTPC by pipeline contractors. However, the actual composition of the work force will depend upon the individual contractor responsible for the construction of each section.

TABLE 19. Estimated Manpower Schedule for

Construction Sections 4, 5, 5S, 6, 6D, 6S, 6H, 7, and 7D

SKILL CATEGORY[1]	No.	Month 1	2	3	4	5	6	7	8	9	10	Total/ Job
Supervisory & Field Office:												
Superintendent	1	1	1	1	1	1	1	1	1	1	.5	9.5
Assistant Superintendent	2	1	2	2	2	2	2	2	2	1	1	17
Field Office Manager	1	1	1	1	1	1	1	1	1	1	1	10
Engineer	2	.5	1.5	2	2	2	2	2	2	1	.5	15.5
Timekeeper	2	.5	1	2	2	2	2	2	2	1	1	15.5
Materialsman	1	.5	1	1	1	1	1	1	1			7.5
Parts Runner	1	.5	1	1	1	1	1	1	1			7.5
Warehouseman	2	.5	1.5	2	2	2	2	2	2	1		15
Clerks	3	.5	1.5	3	3	3	3	3	3	1.5	.5	22
Watchman	4	.5	1.5	4	4	4	4	4	4	2.5		28.5
Purchasing Agent	1	.5	1	1	1	1	1	1	1			7.5
Right-of-way Worker	2	1	2	2	2	2	2	2	2	1	.5	16.5
Teamsters	8		4	8	8	8	8	8	8	1.5		53.5
Spread Foreman	27	4	15	27	27	27	27	27	27	20	1	202
Pipeline Welders	38	2	30	38	38	38	38	38	38	25		285
Welder's Helpers	37	2	30	37	37	37	37	37	37	25		279
Operators:												
Dozer	24	1	15	24	24	24	24	24	24	18	2.5	165.5
Tractor	24	1	15	24	24	24	24	24	24	18	2.5	165.5
Grader	1		1	1	1	1	1	1	1	1	1	9
Ditcher	2		2	2	2	2	2	2	2	1		15
Front-End Loader	2		1	2	2	2	2	2	2	1		14
Backhoe	11		6	11	11	11	11	11	11	5		77
Pipe Bending Machine	2		2	2	2	2	2	2	2	1		15
Backfiller	1		1	1	1	1	1	1	1	1		8
Chipping Machine	1		1	1	1	1	1	1	1			7
Rock Drills	4		4	4	4	4	4	4	4	1		29
Boring Machine	1		1	1	1	1	1	1	1			7
Rock Pickers	2		1	2	2	2	2	2	2	1		14

TABLE 19. (cont.)

SKILL CATEGORY[1]	No.	Month 1	2	3	4	5	6	7	8	9	10	Total/ Job
Teamsters:												
A-Frame Truck	3		1.5	3	3	3	3	3	3	1.5		21
Flatbed Truck	4		1.5	4	4	4	4	4	4	1.5		27
Dump Truck	4		1.5	4	4	4	4	4	4	1.5		27
Float Truck	4		1.5	4	4	4	4	4	4	1.5		27
Stringing Truck	8		4	8	8	8	8	8	8	2		54
Mechanics	4		4	4	4	4	4	4	4	2		30
Crew Truck	2		2	2	2	2	2	2	2	1		15
Fuel Truck	2		2	2	2	2	2	2	2	1	1	16
Grease Truck	1		1	1	1	1	1	1	1	1	1	9
Bus	3		2	3	3	3	3	3	3	1		21
Parts Van	2		1	2	2	2	2	2	2	1		14
Semi-Skilled	32	1	22	32	32	32	32	32	32	30	1.5	246.5
Unskilled	164	2.5	45	164	164	164	164	164	164	128	2	1,161.5
TOTAL BY MONTH	440	21.5	234	440	440	440	440	440	440	303.5	17.5	3,174.5

[1]Does not include NTPC inspectors and radiographic technicians (23 per section).

SOURCE: NTPC 1978d. This is an estimated manpower schedule and will vary by contractor.

TABLE 20. Estimated Manpower Schedule for Construction

Sections 7H, 7L, 8, 8D and 8H (Persons/Months Per Station)

Skill Category[1]	No.	Month 1	2	3	4	5	6	7	8	9	10	Total Job Person Months
Supervisory & Field Offices:												
Superintendent	1	1	1	1	1	1	1	1	1	1	.5	9.5
Assistant Superintendent	2	1	2	2	2	2	2	2	2	1	1	17
Field Office Manager	1	1	1	1	1	1	1	1	1	1	.5	9.5
Engineer	1	.5	1	1	1	1	1	1	1	1		8.5
Timekeeper	2	.5	1.5	2	2	2	2	2	2	1	.5	15.5
Materialsman	1	.5	1	1	1	1	1	1	1	.5		8
Parts Runner	1	.5	1	1	1	1	1	1	1	1		8.5
Warehouseman	1	.5	1	1	1	1	1	1	1	1		8.5
Clerks	3	.5	2	3	3	3	3	3	3	1.5		22
Watchman	2	.5	1.5	2	2	2	2	2	2	1	.5	15.5
Purchasing Agent	1	.5	1	1	1	1	1	1	1			7.5
Right-of-way worker	1	1	1	1	1	1	1	1	1	1		9
Spread Foreman	19	3	10	19	19	19	19	19	19	12	.5	140
Welders:												
Pipeline Welders	48	2	30	48	48	48	48	48	48	35	.5	356
Welder's Helpers	45	2	30	45	45	45	45	45	45	35	.5	338
Operators:												
Dozer	28	1.5	18	28	28	28	28	28	28	15	1	203.5
Tractor	28	1.5	18	28	28	28	28	28	28	15	1	203.5
Grader	1		1	1	1	1	1	1	1	1	1	9
Ditcher	2		2	2	2	2	2	2	2	1		15
Front-End Loader	2		1	2	2	2	2	2	2	1	.5	14.5
Backhoe	12		5	12	12	12	12	12	12	5		82
Pipe Bending Machine	2		2	2	2	2	2	2	2	1		15
Backfiller	1		1	1	1	1	1	1	1	1		8

TABLE 20. (cont.)

Skill Category[1]	No.	Month 1	2	3	4	5	6	7	8	9	10	Total Job Person Months
Chipping Machine	1		1	1	1	1	1	1	1			7
Rock Drills	4		2	4	4	4	4	4	4	1		27
Boring Machine	1		1	1	1	1	1	1	1			7
Rock Pickers	2		1	2	2	2	2	2	1			14
Teamsters:												
A-Frame Truck	4		2	4	4	4	4	4	4	2	.5	28.5
Flatbed Truck	5		2	5	5	5	5	5	5	3	1	36
Dump Truck	5		2	5	5	5	5	5	5	3	1	36
Float Truck	5		3	5	5	5	5	5	5	2	.5	36
Stringing Truck	10		6	10	10	10	10	10	10	2		68
Mechanics	6		4	6	6	6	6	6	6	4	2	46
Crew Truck	2		2	2	2	2	2	2	2	2		16
Fuel Truck	2		2	2	2	2	2	2	2	2	1	17
Grease Truck	1		1	1	1	1	1	1	1	1	1	9
Bus	4		3	4	4	4	4	4	4	3		30
Parts Van	3		2	3	3	3	3	3	3	2		22
Semi-Skilled	59	1	15	59	59	59	59	59	59	50		420
Unskilled	81	1	26	81	81	81	81	81	81	65		578
Total By Month	400	20	208	400	400	400	400	400	400	276	17	2,999

[1]Does not include Northern Tier Pipeline Company construction inspectors and radiographic technicians (23 per section).

SOURCE: NTPC 1978d. This is an estimated manpower schedule and will vary by contractor.

TABLE 21. Preliminary Pipeline Construction

Manpower Requirements by Skill

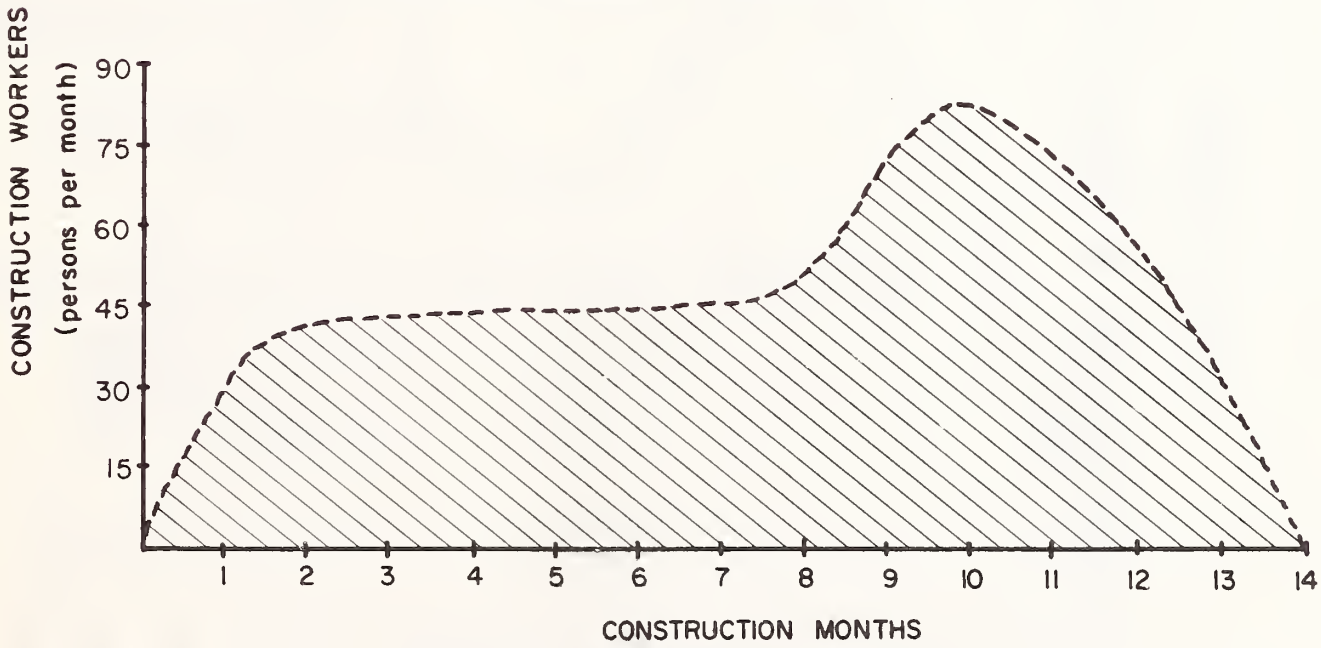
Skill/Trade	Pipeline Construction 4, 5, 6, 6H, 7[1] Number	% of Total	7H, 7L, 8, 8H Number	% of Total
Supervisory and Field Office				
Supervisors, managers	6		5	
Teamsters	8		0	
Spread Foremen	27		19	
Others	16		12	
Subtotal	57	12.3	36	8.5
Pipeline Welders	38	8.2	48	11.3
Welders Helpers	37	8.0	45	10.6
Operators				
Dozer	24		28	
Tractor	24		28	
Backhoe	11		12	
Other	16		16	
Subtotal	75	16.2	84	19.9
Teamsters	37	8.0	47	11.1
Semi-skilled Laborers	32	6.9	59	13.9
Unskilled Laborers	164	35.4	81	19.2
Inspectors	10	2.2	10	2.4
Radiographic Technicians	13	2.8	13	3.1
TOTAL	463	100.0	423	100.0

SOURCE: NTPC 1978e.

[1]Includes sections 4K, 5K, 5S, 6S, 5A.

Construction of the delivery facilities (DF) for the Glacier and Western pipelines would require an estimated 638 and 517 person-months, respectively. Figure 10 illustrates the manpower schedule which might result at the Glacier DF if construction is continuous. The work force levels off at around 40 persons from months 2 through 9 before climbing to a peak of around 84 in the tenth month and falling off to 50 over a three-month period, before winding down in month 14. While this pattern corresponds to a likely construction schedule, the actual manpower might vary substantially.

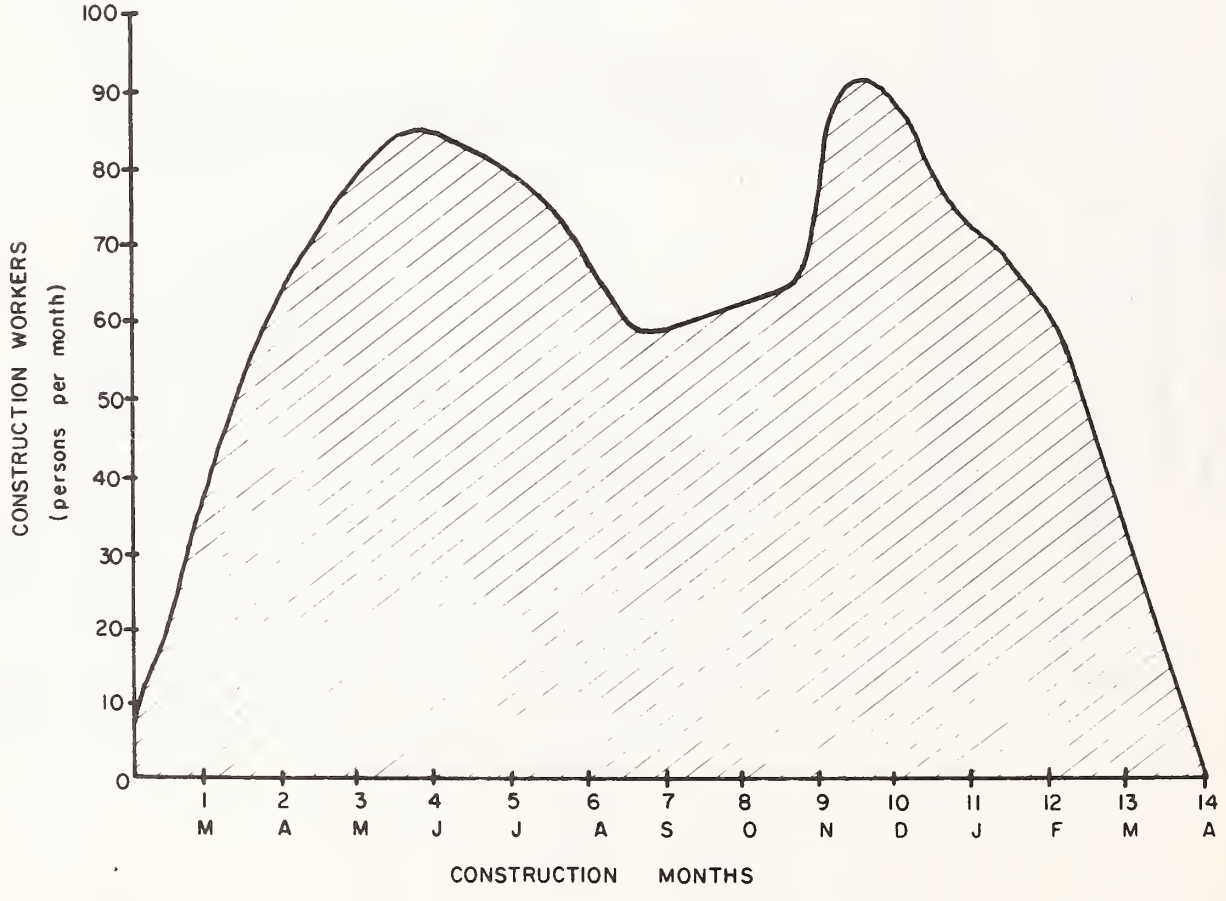
FIGURE 10.
ESTIMATED MANPOWER SCHEDULE, GLACIER DELIVERY FACILITY



The range for socioeconomic impact of the fixed site facilities must consider the pump station and delivery facility work forces, as shown in figure 11, based upon the manpower schedules of tables 16, 17, and 18. For the Glacier pump station/delivery facility the combination of these data show three months (May, June, and December) when the work force would exceed 80 persons.

FIGURE 11.

ESTIMATED COMBINED PUMP STATION AND GLACIER DELIVERY FACILITY MANPOWER AND CONSTRUCTION SCHEDULE.



Permanent Employment--Operation Period

A total of 48 persons are projected to be permanently employed by the Northern Tier Pipeline in Montana (NTPC 1978a). All 48 jobs are assumed to be based in Billings, although NTPC is currently evaluating the advisability of locating certain of the operations and maintenance personnel in other communities such as Missoula, Helena, and Harlowton. The number of jobs affected by such a decision will be fewer than 20. Table 22 summarizes the permanent NTPC staff in Billings by function.

TABLE 22. Permanent Montana Employment on Northern Tier Pipeline.

Classification	Number Required
Billings District Operation and Maintenance	
Supervisory Personnel	2
Technical Staff	7
Clerical and Other	2
SUBTOTAL	11
Headquarters Office	
Executives	10
Clerical and Accounting	13
Other	4
SUBTOTAL	27
Operation and Maintenance System Support (Headquarters)	
Manager, Supervisors	5
Technical Staff	3
Clerical and Draftsman	2
SUBTOTAL	10
TOTAL	48

SOURCE: NTPC 1978a

CHAPTER THREE

POTENTIAL IMPACTS OF PROPOSED NORTHERN TIER PIPELINE PROJECT

TYPES OF POTENTIAL IMPACTS

This section describes the types of socioeconomic impacts that can result from the construction of a major pipeline project and also those that are not likely to occur. Where the nature and level of impact are influenced by site-specific considerations, these will be discussed. This report documents information on pipeline worker characteristics and pipeline construction impacts on several communities in the United States. It reports the results of surveys conducted at four project sites and in seven communities, of which three were currently being affected by a pipeline project and four had been affected within the last twelve months.

An understanding of the potential socioeconomic impact of the construction of a major pipeline (particularly that caused by the work force) requires a consideration of several types of potential impact:

1) Impacts due to the demographic composition of the work force. What percentage of the work force will be local or regional residents? What percentage of the nonlocal work force will be accompanied by their families? How many children will each family have?

2) Lodging impacts. Where will the nonlocal work force stay? For how long? In what type of lodging?

3) Economic impacts. What expenditure patterns can be expected from the local and nonlocal work force? What secondary employment effects can be expected? What will be the effect of the project on the local tax base?

4) Impacts on services and facilities. Will the public and commercial services available in the construction areas be sufficient for the work force? Will residents of these areas experience any disruption of services?

The potential for impacts in each of these four areas as a result of the proposed pipeline will be discussed in a later section of this chapter, "Impact Assessment."

RESULTS OF RECENT RESEARCH

During the last five years, many post impact studies have been carried out in the project region, but most of these studies have been concerned exclusively with the socioeconomic impacts of fixed-site construction projects

such as coal mines, power plants, and dams. Information on community impacts of such projects is extensive and shows a great deal of variability from one case to the next.

Useful data are also available on the demographic/economic characteristics of construction workers associated with fixed-site projects (Old West Regional Commission 1976; USDI 1977). However, pipeline construction projects and other linear construction projects (transmission lines, canals, highways, and railroads) are quite different from fixed-site projects because pipeline workers move as the work location moves. Research shows that the economic/demographic characteristics of pipeline construction workers and their impacts on communities are different from those of workers on large-scale, fixed-site facilities.

The primary research consisted of three elements:

1) A survey of pipeline construction workers at ongoing projects (Rawlins, Wyoming; Peace River, Alberta; Lake Charles, Louisiana; and Winnefield, Louisiana) together with an investigation of community impacts at all of the sites except Rawlins.

2) A post-impact study of four towns in the Northern Great Plains (Carrington, Wahpeton, and Valley City, North Dakota, and Malta, Montana).

3) Telephone and personal interviews with pipeline construction supervisors and office administrators of several construction contractors.

RESULTS OF THE PIPELINE CONSTRUCTION WORKER SURVEY

The construction worker survey was designed to provide data on the particular characteristics of construction workers most apt to have impact upon local communities. These characteristics include:

1) Local/nonlocal composition[1]

2) Location and type of housing used by the workers

3) Occupation, age, and marital status of the workers

4) Number of children age 18 or under

5) Number of nonlocal workers accompanied by their families

6) Percentage of pay spent locally by nonlocal workers

---

[1]Local workers are those whose residences before taking the job are the same as during the job.

A total of 725 questionnaires were distributed at four construction sites. Of these, 260 were returned, a response rate of thirty-six percent. Because workers were surveyed at only four construction sites, the sample is somewhat smaller than in most studies of other types of construction workers; also, the workers involved in the construction of pump stations and delivery facilities were not surveyed, although such workers would be present on the Northern Tier Project.[1]

The results of the pipeline construction worker survey are shown in table 23. Table 24 compares these results for nonlocal pipeliners with those from two other construction worker studies. In general, pipeliners are much older, have fewer children under 18, and include more single workers. Moreover, a much smaller percentage of married, nonlocal pipeline workers bring their families with them. For every 100 nonlocal pipeline workers, an average temporary population influx of only 130 would occur. The lodging patterns of nonlocal workers are also markedly different; 41.5 percent use motels, and 24.4 percent use travel trailers/RVs/campers.

RESULTS OF THE COMMUNITY IMPACT SURVEY

In the course of the community surveys, every effort was made to uncover evidence of socioeconomic impact -- particularly, problems which the presence of a significant number of outsiders in a community might be expected to cause. The results of the opinion leader/merchant/public official interviews in all seven communities were somewhat surprising because of the difficulty encountered in identifying any problems at all. In fact, the general conclusion drawn from the study was that, taken as a group, pipeliners and their families were regarded as reasonably decent, well-behaved, friendly people and an economic advantage to the community in which they resided. That community opinion leaders in Montana are also generally aware of these potential effects is reflected in respondents' opinions of pipeline project impact as recorded in the Public Attitude Assessment Program (Mountain West Research, Inc. 1979). Overall, the research indicates that a limited number of adverse impacts can be anticipated. Community surveys revealed the following effects of pipeline workers and their families:

1) No additional burden on law enforcement

2) No additional burden on fire protection and medical services

3) Limited number of children accompanying workers easily accomodated within the school systems

4) No significant additional demands placed on sewer and water facilities

---

[1] In Montana, these workers are projected to represent about 17 percent of the total manpower requirements.

TABLE 23. Summary of Results: Pipeline Construction Worker Profile

Response Rate (percentage) 35.9

Sample Size 260 survey cards distributed among four projects

	Local	Nonlocal	Total
Percentage composition of respondents	30.6	69.4	100.0
Occupational distribution of respondents			
office & supervisory	0	6.2	6.2
laborers (unskilled & semi-skilled)	11.3	13.2	24.5
welder's helpers	3.1	8.9	12.0
welders	4.2	6.6	10.8
teamsters	1.2	6.9	8.1
operating engineers	7.7	19.0	26.7
other	3.1	8.5	11.6
Marital status and number of children 18 years old or less			
single, no children	10.4	24.1	
single, with children	6.5	9.6	
married, no children	19.5	23.0	
married, one child	18.2	18.0	
married, two children	24.7	16.3	
married, three children	11.7	5.6	
married, four children	3.9	1.7	
married, more than four children	1.3	1.7	
no response	3.9	0	
Type of housing unit at worker's local place of residence			
single family dwelling	65.8	5.7	
apartment/duplex/condominium	10.5	13.1	
mobile home	18.4	6.8	
travel trailer/RV	3.9	24.4	
motel/hotel	1.3	41.5	
sleeping room	0	1.1	
tent	0	6.8	
Percentage of married nonlocal workers with family present		24.6	
Average family size of married workers	3.4	3.2	3.3
Average age of work force (years)	34.3	36.1	35.7
Average population influx per 100 nonlocal workers		129.8	

SOURCE: Mountain West Research, Inc. 1979.

TABLE 24. Comparison of Construction Worker Profiles[1] (nonlocal workers)

	Power Plant Workers[1]	Water Resources Project Workers[2]	Pipeline Workers
Median age of worker	22.5 yrs		36.1
Average family size	3.78	3.51	3.2
Percentage single	24.6	26.8	33.7
Percentage married	75.4	73.2	66.3
Percentage of married with families present	65.0	64.9	24.6
Housing preference (percentage)			
Single family dwelling	19.9	30.3	5.7
Apartment	10.0	20.1	13.1
Mobile home	53.0	26.0	6.8
Travel trailer			24.4
Motel			41.5
Sleeping room		5.9	1.1
Other (tents)	18.0		6.8
Local percentage of labor force	39.9	47.2	30.6[3]

[1]Construction Worker Profile, prepared for the Old West Regional Commission 1976. Results of surveys of construction workers at fourteen power plant sites.

[2]Construction Worker Survey, prepared for the U.S. Bureau of Reclamation, October 1977. Results of construction worker surveys carried out at twelve water resources project sites.

[3]This result is heavily weighted by the Louisiana projects where the local labor composition was 69.9 percent for Lake Charles and 40.7 percent for Winnfield.

5) Significant demands on lodging facilities[1]

6) Positive contributions by workers and their spouses to community social activities

7) Little friction with local residents, except for a few disputes in bars

8) Leisure-time drinking by pipeliners apparently understood by locals and not a cause of friction

9) No noticeable increase in traffic accidents

10) A significant contribution made to local income through expenditures for food, drink, lodging, recreation, and merchandise

It was apparent from these surveys that construction contractors could influence how well workers and local residents got along by: reprimanding or firing troublemakers before major incidents developed; informing the community in advance of who was coming, when, and what to expect; and designating a representative to whom local residents could complain if problems arose. (Green Construction Company, for example, received high marks for its attentiveness to community relations while working on the Dome Pipeline in North Dakota.)

While problems were not encountered in finding adequate lodging for Dome Pipeline workers, interviews in Carrington (a town of 2,500) indicated that the town could not have accommodated many more than the 100-500 pipeliners lodged there. Carrington has a strong traditional commercial trade and most of the hotels and motels in town reserved a significant portion of their rooms for traditional clients. A similar town along the Northern Tier route could not accommodate the entire 300-400 nonlocal construction workers projected for spread construction. Unless exceptional circumstances prevailed, they would have to be accommodated in several towns, drawing on rooms in private houses as well as on public facilities.

Due to the short-term nature of construction period impacts, it would not be prudent to make capital investments in public services and facilities to accommodate them. Moreover, experience indicates that such investments are simply not required.

While the community impact surveys carried out related to projects involving approximately half the number of workers per spread anticipated for Northern Tier, the survey results generally indicate that the categories of potential significant impact will be the following:

---

[1]In spite of these demands, no permanent adverse effects on rental housing prices were reported.

1) Lodging: Transient lodging facilities must house or accommodate approximately 350 to 425 nonlocal construction workers,[1] plus those families that accompany the workers, for periods of two to four months.[2]

2) Restaurants, Cafes, Bars: These establishments must feed and entertain the nonlocal work force.

3) Schools: The number of school age children per spread could total sixty to seventy. School capacities along the right-of-way appear adequate to accommodate this temporary increase.

4) Health Care Services: Limited short-term demands may be placed on local medical facilities.

Categories in which previous experience indicates there will be little or no impact are:

1) Law enforcement services

2) Fire protection services

3) Emergency medical care services

4) All capital facilities (schools, water supply, sewerage, and solid waste disposal)

5) Mental health services

6) Recreational facilities (while on a job, pipeliners typically work ten hours per day, six days per week, and have little time for recreation)

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[1]Total transient lodging demand due to the project will be somewhat greater due to the presence of a variety of federal and possibly state inspectors, the number of which as not yet been estimated.

[2]These facilities include hookups for RVs/campers.

IMPACT ASSESSMENT

IMPACTS DUE TO THE DEMOGRAPHIC COMPOSITION OF THE WORK FORCE

Local/Nonlocal Composition of the Work Force

NTPS construction actually consists of two general tasks, each with its own expected maximum Montana employment: (1) fixed-site construction (pump stations and delivery facilities); and (2) construction of the pipeline itself. NTPC will engage contractors for each pipeline section and fixed-site facility. The same construction contractor might be responsible for more than one section spread and/or fixed-site facility. All contractors will employ union labor.

The local/nonlocal[1] composition of the work force is one of the key variables influencing the nature and intensity of socioeconomic impact. If all of the workers on a project are local, little in the way of adverse socioeconomic impact may be expected to occur. But if all of the workers on a large project are nonlocal, there may be severe adverse socioeconomic impacts, depending upon how long they stay and upon the community affected. Therefore, in assessing the potential impact of the proposed Northern Tier Pipeline in Montana, an estimation of the local and nonlocal labor components must be made.[2] To make this estimation and also because of interest in the likely statewide employment effects of the project, the work force is analyzed in terms of its Montana and out-of-state components.

A variety of factors influence the Montana/non-Montana composition of the pipeline construction work force. Among these factors are two whose influence is extremely important to Montana:

1) The pipeline construction contractors for this project would be unionized; and

2) Informal contractor/union arrangements allow the contractor to select roughly fifty percent of the workers required for the project (Green Construction Company 1978, Natural Pipeline Company 1978, Reading and Bates Construction Company 1978).

Since no unionized pipeline contractors capable of taking on a job of this size are located in or near Montana (most are located in the southern states), and since the personnel with whom qualified contractors are familiar are also almost

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[1]Local workers are defined as persons whose place of residence while on the job is the same as it was before the job. This is different from the "local" hire" category that also includes nonlocal workers. The concept should not be confused with the Montana/non-Montana breakdown of the labor force.

[2]The errors of estimation in this step are certain to be large. A "best guess" estimate has been developed, but the uncertainties inherent in its calculation must be borne in mind when making decisions based upon its results.

entirely out-of-staters, the non-Montana share of the work force will be at least fifty percent. Other factors which may drive this figure even higher include, for example, the highly specialized nature of certain pipeline construction skills, and the consequent requirement of drawing on a high percentage of out-of-state workers. To illustrate this point, Union Local 798 (Tulsa, Oklahoma) provides all of the pipeline welders and a good share of the welder's helpers to major unionized projects in the United States. Recent pipeline experience in Montana and North Dakota, supplemented by information from construction contractors, indicates that welding jobs will probably include little Montana labor.[1] The Operating Engineers' Local in Helena will nominally supply Montana equipment operators to pipeline construction spreads in the state. In reality, qualified local operators will have other construction job opportunities from which to choose, will be few in number for key skills like that of side-boom operator, and may be unwilling to travel to spreads in places like eastern Montana[2] to work on the job. These considerations, together with the contractor's fifty percent arrangement will probably combine to limit Montanans' share of these jobs on the pipeline to about twenty percent.

The other categories in which out-of-state workers are expected to predominate include supervisory staff (100 percent), field office staff (80 percent), and NTPC construction inspectors (100 percent). Overall, the teamster and laborer categories are forecast to average two-thirds out-of-state workers, although their shares will probably be lower in the western part of the state and higher in the eastern part.

Tables 25 and 26 provide a breakdown of pipeline construction jobs by skills and estimate the Montana labor component. Statewide, it is estimated that Montanans will account for a maximum of twenty-two to twenty-three percent of employment on the NTPS construction spreads -- a total of 398 jobs on sections 5 to 8.

There are virtually no qualified unionized contractors for the fixed-site facilities in Montana (Flint Engineering 1979). However, some Montana-based subcontractors will probably be engaged for certain aspects of fixed-site construction. It is assumed that Montana subcontractors handling fixed-site construction maintain their own work forces of union members. Certain construction tasks (e.g. pipe welding) will require experienced out-of-state contractors who, it is assumed, will bring in their own union work forces.

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[1]Under exceptional conditions, this may not be the case. For example, on the 1977-1978 Dome Pipeline project in North Dakota, severe winter weather drove away a large number of nonlocal welder's helpers, enabling local area residents to be employed in their stead.

[2]Discussions with pipeline contractors have revealed great difficulty in hiring laborers, teamsters, and equipment operators in the oil and gas boom areas of eastern Montana (Wibaux, Richland, Dawson, Roosevelt, and Sheridan counties).

TABLE 25. Skill/Position Breakdown of Pipeline Construction Workers: Maximum Montana Employment Expected Construction Sections 3-7.

Skill/Position	Total Jobs[1]		Maximum Montana Jobs	
	Percentage	Number	Number	Percentage of Total
Supervisory & Field Office	6.7	30	4	13
Spread Foreman	6.0	27	0	0
Welders	8.4	38	0	0
Welders Helpers	8.2	37	7	20
Equipment Operators	16.7	75	15	20
Teamsters	8.2	37	12	33
Laborers[2]	43.6	196	65	33
NTPC Inspectors	2.2	10	0	0
TOTAL	100.0	450	103	23

[1]NTPC 1978a.

[2]Semiskilled and unskilled.

TABLE 26. Skill/Position Breakdown of Pipeline Construction Workers: Maximum Montana Employment Expected Construction Section 5.

Skill/Position	Total Jobs[1]		Maximum Montana Jobs	
	Percentage	Number	Number	Percentage of Total
Supervisory & Field Office	4.1	17	2	12
Spread Foreman	4.6	19	0	0
Welders	11.7	48	0	0
Welders Helpers	11.0	45	9	20
Equipment Operators	20.5	84	17	20
Teamsters	11.5	47	15	33
Laborers	34.1	140	46	33
NTPC Inspectors	2.4	10	0	0
TOTAL	100.0	410	89	22

[1]NTPC 1978a.

[2]Semiskilled and unskilled.

Based on skill composition data furnished by Butler Associates (NTPC 1978e), it appears that about fifty percent of the work force required for fixed-site construction have specialized skills not found in Montana. It is assumed, therefore, that fifty percent of the fixed-site workers will be out-of-state labor for all construction months. Further, Montana subcontractors and their work forces can also be nonlocal, in the sense that they cannot commute to the construction site from their places of residence.[1] Montana contractors are capable of performing such routine construction tasks as site grading; most fixed-site locations are within commuting distance to cities where contractors can be found to perform these construction tasks. Only three exceptions exist: (1) northeastern Montana, in the vicinity of Sidney and Wolf Point, where the economic boom due to oil and gas developments is taking place; (2) the vicinity of Circle, which has few unionized civil engineering contractors; and (3) the vicinity of Plentywood, which also has few contractors. It is assumed that the fixed-site work force in these latter locations will be entirely nonlocal, while that for all other fixed-site construction will be fifty percent local. These figures are reported in tables 27, 28, 29, and 30.

Out-of-state union members working on the NTPS project will be transferred to Montana and provided to construction contractors out of Montana union locals, with the exception of welders (Local 798, Tulsa). What about Montana members of the teamsters, laborers, and operating engineers union? How can their local and nonlocal shares of the NTPC labor force be estimated?

In essence, the fact that Montana unions will attempt to fill as many NTPS jobs as possible with Montanans does not necessarily imply a geographic concentration of local workers from counties in which the pipeline will be constructed. Any such geographic concentration depends in two ways upon the distribution of union members among Montana counties. First, the availability of needed skills is concentrated in certain counties: Silver Bow County, for example, contains a disproportionate number of the state's unemployed equipment operators. Second, the closer to his permanent residence the project is located, the more likely it is that a union member will accept a job. Unfortunately, no recent county-level data for skill distribution exist, and appropriate compilations of union membership by county are not available. In fact, the only existing data which bear any relationship to the procedure by which Montana unions might fill NTPC jobs is unemployment by county.[2] Therefore, to estimate local workers for pipeline construction (where local worker is defined as one who lives within commuting distance to the construction site), the following assumptions are made:

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[1]This effect is indicated by the greater proportion of nonlocal workers on fixed-site projects in eastern Montana.

[2]These unemployment data serve as an indicator of current union and nonunion labor availability. Unemployed nonunion workers could join the appropriate unions to become eligible for work on the NTPS project.

TABLE 27. Nonlocal Workers NTPR.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SECTION 4								463	327	17				
Pipeline								463	327	17				
SECTION 5	26	235	467	475	474	470	463	464	328	24				
Pipeline	22	229	453	453	453	453	453	453	317	17				
P.S. 1N	4	6	14	22	21	17	10	11	11	7				
SECTION 6	30	237	477	493	491	483	469	471	335	31				
Pipeline	22	225	449	449	449	449	449	449	313	17				
P.S. 2N	4	6	14	22	21	17	10	11	11	7				
P.S. 3N	4	6	14	22	21	17	10	11	11	7				
SECTION 7	38	268	509	523	521	513	499	467	365	73	39	34	24	16
Pipeline	22	234	459	459	459	459	459	425	322	17				
P.S. 4S	4	6	14	22	21	17	10	11	11	7				
P.S. 5N	4	6	14	22	21	17	10	11	11	7				
D.F.	8	22	22	20	20	20	20	20	21	42	39	34	24	16
SECTION 8	49	274	509	541	537	491	461	467	373	99	62	54	38	13
Pipeline	20	215	420	420	420	390	390	390	295	17				
P.S. 6N	8	12	27	44	42	34	19	22	22	7				
P.S. 7N	8	12	27	44	42	34	19	22	22	7				
D.F.	13	35	35	33	33	33	33	33	34	68	62	54	38	13

TABLE 28. Nonlocal Workers, Hi-Line Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SECTION 4								463	327	17				
Pipeline								463	327	17				
SECTION 5	30	241	481	489	487	479	465	467	339	31				
Pipeline	22	229	453	453	453	453	453	453	317	17				
P.S. 1H	4	6	14	22	21	17	10	11	11	7				
P.S. 2H	4	6	14	22	21	17	10	11	11	7				
SECTION 6	26	221	462	470	469	465	458	459	324	22				
Pipeline	22	215	448	448	448	448	448	448	313	15				
P.S. 3H	4	6	14	22	21	17	10	11	11	7				
SECTION 7	36	244	465	479	477	439	425	427	334	73	39	34	24	16
Pipeline	20	210	415	415	415	385	385	385	291	17				
P.S. 4H	4	6	14	22	21	17	10	11	11	7				
P.S. 5H	4	6	14	22	21	17	10	11	11	7				
D.F. 4H	8	22	22	20	20	20	20	20	21	42	39	34	24	16
SECTION 8	41	262	483	497	495	457	443	445	352	97	62	54	38	13
Pipeline	20	215	420	420	420	390	390	390	296	15				
P.S. 7H	4	6	14	22	21	17	10	11	11	7				
P.S. 8H	4	6	14	22	21	17	10	11	11	7				
D.F. 9H	13	35	35	33	33	33	33	33	34	68	62	54	38	13

TABLE 29. Nonlocal Workers Raynesford Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	12	13	14	
SECTION 4	)													
SECTION 5	)	See table 17.												
SECTION 6	)													
SECTION 7	32	239	452	458	457	423	416	323	49	49	39	34	24	16
P.S. 4R	4	6	14	22	21	17	10	11	11	7				
D.F. 5R	8	22	22	20	20	20	20	20	21	42	39	34	24	16
Pipeline	20	211	416	416	416	386	386	386	292	17				
SECTION 8	)	See table 16.												

TABLE 30. Nonlocal Workers, Knox Pass, Arlee, and St. Ignatius Routes.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KNOX PASS														
SECTION 4	4	6	14	22	21	17	10	424	338	34				
Pipeline								463	327	17				
P.S. 1K	4	6	14	22	21	17	10	11	11	7				
SECTION 5	22	228	452	452	452	452	452	452	316	17				
Pipeline	22	228	452	452	452	452	452	452	316	17				
ARLEE														
SECTION 4	See table 16.													
5	30	239	479	487	485	477	463	465	337	31				
Pipeline	22	227	451	451	451	451	451	451	315	17				
P.S. 1S	4	6	14	22	21	17	10	11	11	7				
P.S. 1A	4	6	14	22	21	17	10	11	11	7				
ST. IGNATIUS														
SECTION 4	See table 16.													
5	34	245	493	517	514	502	481	484	348	38				
Pipeline	22	227	451	451	451	451	451	451	315	17				
P.S. 1S	4	6	14	22	21	17	10	11	11	7				
P.S. 2S	4	6	14	22	21	17	10	11	11	7				
P.S. 3S	4	6	14	22	21	17	10	11	11	7				
SECTION 6	26	231	463	471	470	466	459	460	324	24				
Pipeline	22	225	449	449	449	449	449	449	313	17				
P.S. 4S	4	6	14	22	21	17	10	11	11	7				

1) Available union membership is distributed proportionately among Montana counties, according to the distribution of unemployed workers;

2) Available skills (and experience in these skills) needed for pipeline construction are distributed proportionately among Montana counties according to the distribution of unemployed workers;

3) With the exception of watchmen, who are almost always local, no preference exists on the part of the union for geographic residence of the union member in relation to geographic location of the project;[1]

4) Union members who are offered a job exhibit no geographic preference for construction site location of the project;[2] and

5) The number of pipeline construction jobs (excluding watchmen) Montana unions will be able to fill from state residents will average 99 jobs for Sections 3 to 7 and 87 jobs for Section 8 (see tables 25 and 26).

Local workers are allocated to counties in which pipeline construction occurs in proportion to each county's share of 1977 statewide unemployment; this yields the number of local workers (excluding watchmen) for each section by county of residence. Sections range from 159 km (99 mi) to 362 km (225 mi) in length, and data from surveys of construction workers indicate that local workers for construction projects will generally not commute more than 96 km (60 mi) one way.[3] A local worker who is initially able to commute to one point on the section can reasonably be expected to change residence as the construction site moves out of his commuting zone. The only exception is watchmen, who are always local workers.

To adjust for local commuting a calculation is made which averages in each section the number of local workers from all counties who are commuting from their residences during any given month. It is assumed that local workers will be needed during construction months 2 through 9 (March to October according to the proposed schedule). The average of local workers for each section is

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[1]This is an oversimplification since, for example, the teamsters local in Butte has geographic jurisdiction distinct from that in Billings. However, for operating engineers, Local 400 in Helena would be responsible for the Northern Tier Pipeline Project for the entire state.

[2]The last assumption is relaxed in a separate test, in which unemployment in each county was weighted by distance of the county from location of construction, so that the closer the construction site, the more likely it is that union members will accept the job and the more local workers are allocated to the county. Results show that, although the number of local workers more than doubled, the impact on lodging was less than five percent. Conclusions on relative impacts using the procedure described in the text above do not change.

[3]Cases or workers commuting 80 to 90 miles for limited periods of time have been documented, but these are not the rule.

subtracted from the manpower schedule reported in tables 16 to 20 to derive nonlocal workers (those who are not commuting from their permanent residences), for each pipeline section and for each construction month, as reported in tables 27 to 30. The local labor estimates are averages and thus are only approximate.

Family Composition of Nonlocal Workers

To calculate impacts on public services and facilities, it is necessary tc estimate the total population influx (including school-age children) associated with nonlocal construction workers.

Research (Mountain West Research, Inc. 1979) indicates that fewer families would accompany pipeline construction workers than would those of fixed-site workers, since pipeline workers follow a moving construction site and do not live in any location very long. Fixed-site construction for NTPS consists largely of several short-term tasks using nonlocal workers with varying skills. Because of their short-term employment, it is assumed that family accompaniment for NTPS fixed-site workers is identical with that for pipeline construction workers. Surveys of four pipeline projects indicate that, for every 100 pipeline workers, a population influx of 130 persons can be expected (including about thirteen children)(Mountain West Research, Inc. 1979).

An estimate of nonlocal workers expected to lodge in large cities and commuting zones by construction month was previously calculated (tables 27 to 30). These data are used to calculate population influx (including children) by construction month (Mountain West Research, Inc. 1979).

To estimate public services impact by county, it is necessary to estimate population influx by county and also to allocate lodging preferences of nonlocal pipeline workers among smaller places within commuting zones. This is done (for peak population influx) simply by distributing nonlocal pipeline workers in proportion to the relative supply of lodging in a specific town compared to the available supply of lodging in the commuting zone for the construction month in which peak population influx occurs.

Finally, the peak influx of school-age children is estimated by assuming that the age distribution of children under 5 years, 6 to 13 years, and 14 to 17 years who accompany nonlocal workers (Mountain West Research, Inc. 1979) is the same as that of the United States in 1977 (USDC 1974a and b).

LODGING IMPACTS

Methodology

The assessment of lodging impacts along the NTP alternative routes involves a comparison of supply and demand: (1) the total transient lodging available within commuting distance to the work site with (2) the demand for such lodging by the nonlocal work force.

The appendix shows the basic assumptions used here to estimate progress of NTPS construction work on the NTPR, Hi-Line, Raynesford, DNRC Modified Route, and other route alternatives according to the proposed schedule. Figures 3 to 8 present the work schedules for both routes, and for pipeline and fixed-site construction. Using these data, zones are established to identify possible lodging places within commuting distance to the construction site. It is assumed that both fixed-site and pipeline construction workers might travel as far as 96 km (60 mi) from their lodgings to the construction site.

"Transient lodging" is defined as known hotel/motel units and RV/camper hookups (Leahy 1978). More expensive motels, particularly those in heavily-trafficked recreation areas (Dan Cook and Associates 1978), will reserve units in summer for off-the-street tourist trade; the percentage of units reserved is not known. To be conservative, it is assumed that those motels charging a minimum daily rate of $14.00 (Leahy 1978) will reserve fifty percent of their units for tourist trade during the months of June, July, and August.

Transient lodging is extremely scarce in Wolf Point, Sidney, and Poplar because of current oil and natural gas exploration and development activity; it is assumed that ninety percent occupancy rates prevail year-round in these cities.[1] Commuting distances for fixed-site and pipeline construction differ greatly because pipeline work progresses along a moving point. Workers are more likely to commute along the eastward track of the pipeline than to the north or south. Given a choice of places within commuting distance in which to locate, construction workers will choose larger places with more conveniences (Mountain West Research 1976). (The concept of a large place is a relative one, reflecting the availability of lodging services and amenities in an area.) Fixed-site workers will probably choose to locate in the largest places within an assumed 96 km (60 mi) radius of the construction site and will lodge there for the duration of the project. Estimates of nonlocal fixed-site workers from tables 27 to 30 are compared to available transient lodging in likely places for each of the route alternatives and the balance of remaining transient lodging is then calculated.

After accounting for reservations for the tourist trade, occupancy rates of oil and gas drilling workers, and demand by NTPC nonlocal fixed-site construction workers, the remaining lodging units are assumed to be the most available for nonlocal pipeline construction workers. The estimated number of nonlocal pipeline workers is presented as demand, assuming one worker per room, in tables 27 to 30. The balance between supply and demand for lodging by section and construction month is presented in tables 31 to 35. These tables present, as supply, all places within a 96 km (60 mi) commuting distance to the construction site. In fact, it is likely that pipeline construction

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[1]The oil and gas "boom" in eastern Montana is anticipated to strain local lodging/housing facilities for the foreseeable future.

TABLE 31. Pipeline Construction Lodging Unit Supply/Demand NTPR Route.

	Construction Months									
	1	2	3	4	5	6	7	8	9	10
SECTION 4										
Mullan ID								10	10	10
Kellogg, ID								120	120	120
Osburn, ID								30	30	30
Wallace, ID								174	174	174
Thompson Falls								76	76	76
Plains								35	35	35
TOTAL (S)[2]								445	445	445
NONLOCAL (D)[3]								463	327	17
BALANCE								-18	118	428
SECTION 5										
Mullan	10	10	10							
Kellogg, ID	120	120	120							
Osburn, ID	30	30	30	30						
Wallace, ID	174	174	174	174						
Superior	44	44	44	44	32	32	32			
Hot Springs	37	37	37	37	37					
Thompson Falls	76	76	76	76	76					
Plains	35	35	35	35	35	35	35	35		
St. Regis	10	10	10	10	10	10	10			
Missoula*					1323	1331	1345	1778	1778	1786
TOTAL (S)	546	546	546	416	1513	1408	1422	1813	1778	1786
NONLOCAL (D)	22	229	453	453	453	453	453	453	317	17
BALANCE	524	317	93	-37	1060	955	969	1360	1451	1769

TABLE 31. (cont'd)
Construction Months

	1	2	3	4	5	6	7	8	9	10
SECTION 6										
Missoula*	1792	1788	1772	1756						
Deer Lodge					141	141	141	160		
Helena*					675	683	697	958	958	966
TOTAL(S)	1792	1788	1772	1756	816	824	838	1118	958	966
NONLOCAL (D)	22	225	449	449	449	449	449	449	313	17
BALANCE	1770	1563	1323	1307	367	375	389	669	645	949
SECTION 7										
Helena*	972	968	952							
Townsend	26	26	26	26	26					
Wh.Sul.Spr.	78	78	78	78	78					
Harlowton*					125	129	136	135	134	117
Roundup							94	94	94	94
TOTAL(S)	1076	1072	1056	104	229	129	230	229	228	211
NONLOCAL (D)	22	234	459	459	459	459	459	425	322	17
BALANCE	1054	838	597	-355	-230	-330	-229	-196	-94	243
SECTION 8										
Jordan*	48	42	29	12	14	22				
Circle				56	56	56	56	56	56	56
Other						-15	-30	-33		-53
TOTAL(S)	48	42	29	68	70	63	26	23	21	23
NONLOCAL (D)	20	215	420	420	420	390	390	390	295	17
BALANCE	28	-173	-391	-352	-350	-327	-364	-367	-274	6

[1]Assumptions: (1) 50 percent vacancies reserved during tourist season in hotels charging minimum $14 as reported in Leahy 1978 .

(2) 90 percent occupancy rate in oil and gas drilling area.

(3) Demand by nonlocal fixed-site workers deducted from lodging supply in those cities marked*.

[2](S) = Supply of lodging (units).

[3](D) = Number of nonlocal workers requiring lodging (demand).

TABLE 32. Pipeline Construction:

Lodging Unit Supply/Demand DNRC Modified Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SECTION 4	)													
SECTION 5	)				See table 31.									
SECTION 6														
Missoula*	1792	1776	1774	1756	1317									
Drummond	84	84	84	84	77	77	77	84	84					
Deer Lodge	160	160	160	160	150	150	150	160	160	160				
Anaconda					223	223	223	341	341					
Helena*				936	675	683	697	958	958	966				
TOTAL (S)[1]	2036	2002	1998	2916	2442	1133	1147	1543	1543	1126				
NONLOCAL (D)[2]	22	225	449	449	449	449	449	449	313	17				
BALANCE	2014	1777	1549	2467	1993	684	698	1094	1230	1109				
SECTION 7	)													
SECTION 8	)				See table 31.									
Jordan*	48	42	29	12	14	22								
Other[3]*				-8	-6	-8	17	14	13	-6				
TOTAL (S)	48	42	29	4	8	14	17	14	13	-6				
NONLOCAL (D)	20	215	420	420	420	390	390	390	295	17				
BALANCE	28	-173	-391	-416	-412	-376	-373	-376	-282	-23				

*Place of lodging for nonlocal fixed site workers.

[1](S) = Supply of lodging (motel units and RV/trailer/camper hookups).

[2](D) = Demand for lodging (numbers of nonlocal workers).

[3]Includes Circle, Poplar, and Sidney. From approximately July 18 to August 9 and from approximately August 23 to September 20, pipeline route is within 60 miles of Glendive. For those weeks, 148 lodging units are available to nonlocal workers; however, a lodging shortfall of over 200 units will still occur.

TABLE 33. Pipeline Construction:

Lodging Unit Supply/Demand Hi-Line Route.

	Construction Months									
	1	2	3	4	5	6	7	8	9	10
SECTION 4										
Mullan, ID								10	10	10
Kellogg, ID								120	120	120
Osburn, ID								30	30	30
Wallace, ID								174	174	174
Thompson Falls								76	76	76
Plains								35	35	35
TOTAL (S)[2]								445	445	445
NONLOCAL (D)[3]								463	327	17
BALANCE								-18	118	
SECTION 5										
Mullan, ID	10	10	10							
Kellogg, ID	120	120	120							
Osburn, ID	30	30	30	30						
Wallace, ID	174	174	174	174						
Superior	44	44	44	44	32	32	32			
Hot Springs	37	37	37	37	37					
Thompson Falls	76	76	76	76	76					
Plains	35	35	35	35	35	35	35	35		
St. Regis	10	10	10	10	10	10	10			
Missoula*					1323	1331	1345	1778	1778	1786
TOTAL (S)	546	546	546	416	1513	1408	1422	1813	1778	1786
NONLOCAL (D)	22	229	453	453	453	453	453	453	317	17
BALANCE	524	317	93	-37	1060	955	969	1360	1461	

TABLE 33. (cont'd)

	Construction Months									
	1	2	3	4	5	6	7	8	9	10
SECTION 6										
Missoula*	1792	1788	1772	1756						
Ovando	5	5	5	5	5	5				
Helena*					696	700	707			
Great Falls*								1560	1559	1542
TOTAL (S)	1797	1793	1777	1761	701	705	707	1560	1559	1542
NONLOCAL (D)	22	225	448	448	448	448	448	448	313	17
BALANCE	1775	1568	1329	1313	253	257	259	1112	1246	1525
SECTION 7										
Great Falls*	1579	1563	1555	1549	1088					
Fort Benton	50	50	50	50	50	50				
Loma	10	10	10	10	10	10	10			
Big Sandy			44	44	44	44	44	44	44	
Havre*					620	624	631	683	683	
Chinook						47	47	47	47	47
Harlem							127	127	127	127
TOTAL (S)	1639	1623	1659	1653	1812	775	859	901	901	174
NONLOCAL (D)	20	210	415	415	415	385	385	385	291	15
BALANCE	1619	1413	1244	1238	1397	390	474	516	610	159
SECTION 8										
Havre*	690	688								
Chinook	47	47								
Harlem	127	127	127							
Malta*	104	102	94	86						
Saco			17	17	17					
Scobey						95	95	95	95	
Plentywood*							84	81	80	61
TOTAL (S)	968	964	238	103	17	95	179	176	175	61
NONLOCAL (D)	20	215	420	420	420	390	390	390	290	15
BALANCE	948	749	-182	-317	-403	-295	-211	-214	-115	46

TABLE 33. (cont'd)

[1]Assumptions: (1) 50 percent vacancies reserved during tourist season in hotels charging minimum $14 reported in Leahy 1978.

(2) 90 percent occupancy rate in oil and gas drilling area.

(3) Demand by nonlocal fixed-site workers deducted from lodging supply in those cities marked*.

[2](D) = Demand for lodging (number of nonlocal workers).

[3](S) = Supply of lodging (units).

TABLE 34. Pipeline Construction:

Lodging Unit Supply/Demand Raynesford Route.

	Construction Months									
	1	2	3	4	5	6	7	8	9	10
SECTION 4) SECTION 5) SECTION 6) SECTION 7)	See table 33.									
Great Falls*	1579	1563	1555	1549						
Denton		24	24	24	24	24	24	24		
Lewistown				243	203	203	203	243	243	
Winnett						20	20	20	20	20
TOTAL(S)[2]	1579	1587	1579	1816	227	247	247	287	263	20
NONLOCAL (D)[3]	20	211	416	416	416	386	386	386	292	17
BALANCE	1559	1376	1163	1400	-189	-139	-139	-99	-29	3
SECTION 8										
Jordan*	48	42	29	12	14	22				
Other[4]*				-8	-6	-8	17	14	13	-6
TOTAL(S)	48	42	29	4	8	14	17	14	13	-6
NONLOCAL (D)	20	215	420	420	420	390	390	390	295	17
BALANCE	28	-173	-391	-416	-412	-376	-373	-376	-282	-23

[1]Assumptions: (1) 50 percent vacancies reserved during tourist season in hotels charging minimum $14 reported in Leahy 1978.

(2) 90 percent occupancy rate in oil and gas drilling area.

(3) Demand by nonlocal fixed-site workers deducted from lodging supply in those cities marked*.

[2](D) = Demand for lodging (number of nonlocal workers).

[3](S) = Supply of lodging (numbers of nonlocal workers).

[4]Includes Circle, Poplar and Sidney. From approximately July 18 to August 9 and from approximately August 23 to September 20, the pipeline route is within 60 miles of Glendive. For those weeks, 148 lodging units are available to nonlocal workers; however, a lodging shortfall of over 200 units will still occur.

TABLE 35. Pipeline Construction:

Lodging Unit Supply/Demand, Knox Pass, Arlee and St. Ignatius Routes.

	Construction Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KNOX PASS														
SECTION 4)	See table 31.													
Section 5														
Kellogg, ID	120	120	120	120										
Osburn, ID	30	30	30	30										
Mullan, ID	10	10	10	10	10									
Wallace, ID	174	174	174	174	174									
Thompson Falls*	72	70	62	54	55									
DeBorgia	15	15	15	15	15	15								
St. Regis	112	112	112	112	112	112	112	112	112					
Saltese		18	18	18	18	18								
Haugan		30	30	30	30	30	30							
Superior		88	88	88	76	76	76	88	88					
Albertson		20	20	20	20	20	20	20	20					
Missoula				1800	1365	1365	1365	1800	1800	1800				
TOTAL(S)	523	677	669	2469	1875	1636	1603	2020	2020	1800				
NONLOCAL (D)[2]	22	228	452	452	452	452	452	452	316	17				
BALANCE	501	449	217	2017	1423	1184	1151	1568	1704	1783				
ARLEE														
SECTION 4)	See table 31.													
SECTION 5														
Mullan	10	10	10											
Kellogg	120	120	120											
Osburn	30	30	30											
Wallace	174	174	174	174										
Thompson Falls	76	76	76	76	76									
Plains*	31	29	21	13	14	18	25	24						
Hot Springs	37	37	37	37	37	37	37	37						
Ravalli	5	5	5	5	5	5	5	5	5	5				
Ronan		12	12	12	12	12	12	12	12	12				
Polson			85	85	66	66	66	85	85					
Missoula*				1778	1344	1348	1355	1789	1789	1793				
TOTAL(S)	483	493	570	2180	1554	1486	1500	1952	1891	1810				
NONLOCAL (D)	22	227	451	451	451	451	451	451	315	17				
BALANCE	461	266	119	1729	1103	1035	1049	1501	1576	1793				

TABLE 35. (cont'd).

	Construction Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SECTION 4)	See table 31.													
SECTION 5														
Mullan, ID	10	10	10											
Kellogg, ID	120	120	120											
Osburn, ID	30	30	30											
Wallace, ID	174	174	174	174										
Thompson Falls	76	76	76	76	76									
Plains*	31	29	21	13	14	18	25	24						
Hot Springs	37	37	37	37	37	37	37	37						
Polson			71	63	45	49	56	74	74					
Ravalli			40	40	40	40	40	40	40	40				
St. Ignatius			29	29	29	29	29	29	29	29				
Ronan				12	12	12	12	12	12	12				
Seeley Lake*					16	20	27	26	26	30				
Missoula							1365	1800	1800	1800				
TOTAL (S)	478	476	608	444	269	205	1591	2042	1981	1911				
NONLOCAL (D)	22	227	451	451	451	451	451	451	315	17				
BALANCE	456	259	157	-7	-182	-246	1140	1591	1666	1894				
SECTION 6														
Missoula	1800	1800												
Seeley Lake*	33	21	23	15	16									
Lincoln	28	28	28	28	28	28								
Ovando	5	5	5	5	5	5	5	5						
Drummond			84	84	84	84								
Helena*					675	683	697	958	958	966				
TOTAL (S)	1866	1854	140	132	808	800	702	963	958	966				
NONLOCAL (D)	22	225	449	449	449	449	449	449	313	17				
BALANCE	1844	1629	-309	-317	359	351	253	514	645	949				

*Net of Lodging for nonlocal fixed-site workers.

[1](S) = Supply of lodging (motel units and RV/trailer/camper hookups)

[2](D) = Demand for lodging (number of nonlocal workers).

workers, like fixed-site workers, will choose to locate in larger places with more facilities and more amenities (Mountain West Research Inc. 1976). Based on this assumption, it is possible to allocate pipeline workers to specific places. The only major differences between pipeline and fixed-site workers is that, as the pipeline construction spread moves eastward, workers may have a choice between more than one large place in which to locate. At such times, it is assumed that pipeline workers will distribute themselves equally among the number of large-place options. Where no large places exist as options in a commuting zone, no allocation of pipeline workers is attempted. The place-specific lodging impact thus calculated is presented in tables 36 to 40 where lodging demand is by both pipeline and fixed-site construction workers.

Impacts

Two types of impacts will occur in the scenario presented in tables 36 through 40. First, in certain construction months and locations, not enough lodging will be available. Second, if nonlocal workers acquire lodging in the largest city within commuting distance, a conflict may occur between nonlocal workers and tourists (including Canadian shoppers). Tourist trade, particularly in western Montana, and Canadian trade, particularly along the Hi-Line and in Great Falls, is an important component of the local economy. The effect of a lodging shortage for tourists and Canadian shoppers is unknown, but an adverse economic effect is possible.[1] While shortage in accommodations can be quantified, the possible conflict with tourist trade can only be noted.

The impact assessment procedure for lodging shortfall is to compare the transient lodging supply to the nonlocal work force. Although this approach assumes that each nonlocal worker occupies one unit, in actuality, some double occupancy probably will occur for single workers and married workers without families present, while married workers with spouses present will occupy one unit, and married workers with spouses and children present might occupy more than one unit each. In general the one-worker-per-unit assumption probably overestimates the number of units that will actually be required.

Impact on lodging is defined as insignificant when the transient lodging supply is at most twenty-five units below the projected potential demand, moderate when the supply is short by 25 to 100 units, and significant when the supply is inadequate by more than 100 units. The level of impact is reported by place and commuting zone.

To provide a basis of comparison among corridors, the potential lodging shortfall per corridor is shown as person-nights. The shortfall (in terms of person-nights) by commuting zone is also calculated, and the shortfall along the corridor is added and computed as a percentage of total person-nights.

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[1]This adverse impact would occur if workers' local expenditures were less than those that might have been made by tourists or shoppers who did not come because they could not find lodging.

TABLE 36. Lodging Impact -- NTPR.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST														
Supply M/C[1]	546	546	546	416				445	445	445				
Demand M/C	14	151	299	299				305	215	11				
Demand Other Rentals[2]	8	78	154	154				158	112	6				
BALANCE	524	317	93	-37				-18	118	428				
MISSOULA														
Supply M/C	1800	1800	1800	1800	1365	1365	1365	1800	1800	1800				
Demand M/C	20	156	314	326	327	321	313	313	323	20				
Demand Other	10	81	163	167	168	166	160	162	116	11				
BALANCE	1730	1563	1323	1307	870	878	892	1325	1461	1769				
HELENA														
Supply M/C	980	980	980	980	717	717	717	980	980	980				
Demand M/C	20	162	320	30	324	318	310	310	220	20				
Demand Other	10	84	167	14	167	165	159	161	115	11				
BALANCE	950	734	493	936	226	234	248	509	645	949				
TOWNSEND -WHITE SULPHUR SPRINGS														
Supply M/C				104	104									
Demand M/C				302	137									
Demand Other				157	71									
BALANCE				-355	-104									

HARLOWTON

Supply M/C	166	166	166	166	166	166	166	166	166	166	166	166	166	166
Demand M/C	8	18	23	28	192	336	213	185	146	39	26	22	16	11
Demand Other	4	10	13	14	100	170	110	96	76	19	13	12	8	5
BALANCE	154	138	130	124	-126	-340	-157	-115	-56	108	127	132	142	150

ROUNDUP

Supply M/C							94	94	94	94				
Demand M/C							109	115	87	5				
Demand Other							57	60	45	3				
BALANCE							-72	-81	-38	86				

JORDAN

Supply M/C	56	56	56	56	56	56	56	56	56	56				
Demand M/C	18	150	295	167	166	87	13	14	14	5				
Demand Other	10	77	152	87	86	45	6	8	8	2				
BALANCE	28	-171	-391	-198	-196	-76	37	34	34	49				

CIRCLE

Supply M/C				56	56	56	56	56	56					
Demand M/C				139	139	129	129	129	66					
Demand Other				71	71	66	66	66	19					
BALANCE				-154	-154	-139	-139	-139	-29					

EAST

Supply M/C	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Demand M/C	14	31	41	51	50	108	163	164	174	65	41	36	25	9
Demand Other	7	16	21	26	25	56	84	86	92	34	21	18	13	4
BALANCE	2	-24	-39	-54	-52	-141	-224	-227	-243	-76	-39	-31	-15	10

[1]M/C = Motel units and RV/trailer/camper hookups.

[2]Other demand is estimated for private rooms, apartments, etc. No supply estimates of this type of housing were available. Judgement should therefore be used in assessing the meaning of a shortfall, such as in month 4 in the western section.

TABLE 37. Lodging Impact--DNRC Modified Route.

	Construction Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST														
Supply M/C[1]	)													
Demand M/C	)													
Demand Other	)			See table 36.										
BALANCE	)													
MISSOULA														
Supply M/C	1800	1800	1800	1800	1365	1365	1365	1800	1800	1800				
Demand M/C	20	156	289	212	503	319	312	313	223	26				
Demand Other	10	81	149	110	260	165	161	162	116	14				
BALANCE	1770	1563	1362	1478	602	881	892	1325	1461	1769				
DEER LODGE														
Supply M/C			160	160	150	150	150	160						
Demand M/C			24	16	20	53	53	42						
Demand Other			13	9	11	28	27	22						
BALANCE			123	135	119	69	70	96						
HELENA														
Supply M/C	980	980	980	980	717	717	717	980	980	980				
Demand M/C	20	162	321	125	120	265	256	268	221	20				
Demand Other	10	84	166	65	62	137	133	139	114	11				
BALANCE	950	734	493	790	535	315	328	573	645	949				
TOWNSEND-WHITE SULPHUR SPRINGS	)													
HARLOWTON	)			See table 36.										
ROUNDUP	)													
JORDAN	)													
CIRCLE	)													
Supply M/C	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Demand M/C	11	25	33	179	179	216	237	238	30	40	33	29	20	7
Demand Other	6	13	17	93	92	112	122	123	15	21	17	15	11	4
BALANCE	39	18	6	-216	-215	-272	-303	-305	11	-5	6	12	25	45
EAST														
Supply M/C	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Demand M/C	3	6	8	10	9	50	55	55	202	20	8	7	5	1
Demand Other	1	3	4	5	5	76	28	29	104	11	4	3	2	1
BALANCE	9	4	1	-2	-1	-63	-70	-71	-293	-18	1	3	6	11

[1]M/C - Motel units and RV/camper/trailer hookups.

TABLE 38. Lodging Impact--Hi-Line Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST														
Supply M/C[1]	546	546	546	416				445	445	445				
Demand M/C	14	151	299	299				305	215	11				
Demand Other	8	78	154	154				158	112	6				
BALANCE	524	317	93	-37				-18	230	428				
MISSOULA														
Supply M/C	1800	1800	1800	1800	1365	1365	1365	1800	1800	1800				
Demand M/C	20	156	314	326	327	321	313	313	223	20				
Demand Other	10	81	162	166	168	166	160	162	116	11				
BALANCE	1730	1563	1324	1308	870	878	892	1325	1461	1769				
HELENA														
Supply M/C	980	980	980	980	717	717	717	980	980	980				
Demand M/C	3	4	9	15	309	306	302	161	117	5				
Demand Other	1	2	5	7	160	159	156	74	50	2				
BALANCE	976	974	966	958	248	252	259	745	813	973				
GREAT FALLS														
Supply M/C	1591	1591	1591	1591	1129	1129	1129	1591	1591	1591	1591	1591	1591	1591
Demand M/C	21	156	297	302	164	24	20	168	124	42	26	22	16	11
Demand Other	11	82	154	155	85	13	10	87	65	22	13	12	8	5
BALANCE	1559	1353	1140	1134	880	1092	1099	1336	1402	1527	1552	1557	1567	1575
HAVRE														
Supply M/C	694	694	694	694	641	641	641	694	694	694				
Demand M/C	16	146	9	15	150	265	261	261	199	16				
Demand Other	8	79	5	7	78	137	134	135	103	8				
BALANCE	670	469	680	672	413	239	246	298	392	670				

TABLE 38. (cont'd)

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HARLEM														
Supply M/C			127											
Demand M/C			139											
Demand Other			74											
BALANCE			-86											
MALTA														
Supply M/C	108	108	108	108	108	81	81	81	108	108				
Demand M/C	3	4	127	254	14	11	7	7	7	5				
Demand Other	1	2	66	131	7	6	3	4	4	2				
BALANCE	104	102	-85	-277	87	64	71	70	97	101				
SACO														
Supply M/C			17	17	17									
Demand M/C			19	38	277									
Demand Other			9	19	143									
BALANCE			-11	-40	-403									
SCOBEY														
Supply M/C						96	96	96	96					
Demand M/C						257	106	106	79					
Demand Other						133	55	55	41					
BALANCE						-294	-65	-65	-24					
PLENTYWOOD														
Supply M/C	136	136	136	136	136	136	136	136	136	136	136	136	136	136
Demand M/C	11	27	32	36	36	33	179	180	148	59	41	35	27	9
Demand Other	6	14	17	19	18	17	93	93	76	31	21	19	11	4
BALANCE	119	95	87	77	82	86	-136	-137	-88	46	74	82	98	123

[1]M/C = Motel units and RV/trailer/camper hookups.

TABLE 39. Lodging Impact-Raynesford Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST														
MISSOULA)	See table 33.													
HELENA)														
GREAT FALLS														
Supply M/C[1]	1591	1591	1591	1591	1129	1129	1129	1591	1591	1591	1591	1591	1591	1591
Demand M/C	21	158	298	260	27	24	20	168	124	42	26	22	16	11
Demand Other	11	81	154	134	14	13	10	87	65	22	13	12	8	5
BALANCE	1539	1352	1139	1197	1088	1092	1099	1136	1402	1527	1552	1557	1567	1575
DENTON-WINNETT														
Supply M/C				287	227	247	247	287	263	20				
Demand M/C				42	274	254	254	254	192	11				
Demand Other				22	142	132	132	132	132	6				
BALANCE				221	-189	-139	-139	-139	-29	3				
JORDAN	See table 36.													
CIRCLE														
Supply M/C	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Demand M/C	11	25	33	179	179	216	237	238	30	40	33	29	20	7
Demand Other	6	13	17	93	92	112	122	123	15	21	17	15	11	4
BALANCE	39	18	6	-216	-215	-272	-303	-305	11	-5	6	12	25	45
EAST[2]														
Supply M/C	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Demand M/C	3	6	8	10	9	50	55	55	202	20	8	7	5	1
Demand Other	1	3	4	5	5	26	28	29	104	11	4	3	2	1
BALANCE	9	4	1	-2	-1	-63	-70	-71	-293	-18	1	3	6	11

[1]M/C = Motel units and RV/trailer/camper hookups.

[2]Includes Poplar and Sidney.

TABLE 40. Lodging Impact--Knox Pass, Arlee and St. Ignatius Routes.

	Construction Months												
	1	2	3	4	5	6	7	8	9	10	11	12	13
KNOX PASS													
WEST													
Supply M/C[1]	527	683	683	683	76	76	76	445	445	445			
Demand M/C	17	154	307	14	14	11	7	312	223	16			
Demand Other	9	80	159	8	7	6	3	162	115	8			
BALANCE	501	449	217	661	55	59	66	-29	107	421			
MISSOULA													
Supply M/C	1800	1800	1800	1800	1365	1365	1365	1800	1800	1800			
Demand M/C	15	148	296	594	298	298	298	298	208	11			
Demand Other	7	77	153	307	154	154	154	154	108	6			
BALANCE	1778	1575	1351	899	913	913	913	1348	1484	1783			
ARLEE													
WEST													
Supply M/C	487	499	584	35	35	35	35	445	445	445			
Demand M/C	17	154	306	14	14	11	7	312	223	16			
Demand Other	9	79	159	8	7	6	3	162	115	8			
BALANCE	461	266	119	13	14	18	25	-29	107	421			
MISSOULA													
Supply M/C	1800	1800	1800	1800	1365	1365	1365	1800	1800	1800			
Demand M/C	17	152	305	608	325	308	304	304	215	16			
Demand Other	9	79	158	314	168	160	157	158	111	8			
BALANCE	1774	1569	1337	878	872	897	904	1338	1474	1776			
ST. IGNATIUS													
WEST													
Supply M/C	486	498	636	488	281	187	120	445	445	445			
Demand M/C	20	158	316	326	305	285	13	320	230	20			
Demand Other	10	81	163	169	158	148	7	165	119	11			
BALANCE	456	259	157	-7	-182	-246	110	-40	96	424			
MISSOULA													
Supply M/C	1800	1800					1365	1800	1800	1800			
Demand M/C	14	148					297	297	208	11			
Demand Other	8	77					154	154	107	6			
BALANCE	1778	1575					914	1349	1485	1783			
SEELEY LAKE-LINCOLN													
Supply M/C	70	70	70	70	70	70	70	70	70	70	70	70	70	70
Demand M/C	3	4	128	130	34	45	6	7	7	5				
Demand Other	1	2	66	63	17	24	4	4	4	2				
BALANCE	66	64	-124	-115	19	1	60	59	59	63				
DRUMMOND													
Supply M/C			84	84									
Demand M/C			177	188									
Demand Other			92	98									
BALANCE			-185	-202									
HELENA													
Supply M/C	980	980	980	980	717	717	717	980	980	980			
Demand M/C	20	162	321	29	323	318	309	310	155	20			
Demand Other	10	84	166	15	168	165	160	161	80	11			
BALANCE	950	734	493	936	226	234	248	427	745	949			

[1]MC = Motel units and RV/trailer/camper hookups.

The level of impact along any route would be considered insignificant if lodging for the route is short five percent or fewer of the needed person-nights, moderate if short five to twenty percent, and significant if more than twenty percent is lacking.

ECONOMIC IMPACTS

Income/Employment Effects

The effect of money being spent by an influx of pipeline workers will be like that of a stone tossed into a pond. As the ripples of these expenditures spread, their effect is greater. Sparsely populated areas will be little affected economically, but large population centers will benefit more. An economic model developed by Chalmers et al. (1977) indicates that for every dollar increase in basic income an additional $0.23 would be induced in counties with small populations (designated by Chalmers as first order counties); $0.66 would be induced in more populous counties (second order); and $1.02 would be induced in those counties (third order) which are major market centers in a region.

Regardless of where the money is earned, it will be spent where goods and services are available. In any case, each dollar of basic income will induce an additional $1.02 of income somewhere in the regional economy, but the distribution of induced income depends on where the dollar originates. This $1.02 is called the total multiplier.

These multipliers have been developed from personal incomes in counties by the Bureau of Economic Analysis (BEA). Incomes are computed after deductions for social security, and federal and state income taxes are taken into account. Adjustments to the multipliers must be made, however, in the case of nonlocal pipeline workers because of their spending habits. Suppose that these workers spend only seventy percent of their income locally. This amount would stimulate the local economy only seventy percent and would reduce the multiplier. Weighted adjustments to the multiplier may also be needed.

Recent surveys of pipeline construction workers suggest that nonlocals spent fifty-seven percent of what local workers spent locally (Mountain West Research, Inc. 1979). Only 9.2 percent of the Northern Tier Pipeline work force is expected to be local with another thirteen percent from other parts of Montana. Nonlocal Montana workers will contribute to statewide income effects beyond their contribution to the county in which they work. Because the higher skilled, and therefore higher paid, workers will primarily come from out of state, nonlocal workers will receive an estimated ninety-two percent of the gross construction payroll.

Construction camps may, at the discretion of the prime contractors, be the solution to the lodging impact for portions of eastern Montana. The exact location of these construction camps is unknown at present, so the location of the income effects cannot be accurately estimated.[1] For those

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[1]A more detailed discussion of construction camps is presented later in this report.

regions of Montana where construction camps may be necessary only a regional multiplier is given. The construction workers' spending pattern will be substantially changed if they stay in camps. Their lower expenditures on food and lodging can be deduced by using the expenditures of construction workers who receive a $25/day living allowance -- forty-six percent of local worker expenditure (Mountain West Research, Inc. 1979). The multiplier would be adjusted by 0.503 of its original value. Table 41 presents all the multipliers used by the analysis, incorporating all necessary adjustments.

Income multipliers are always greater than one, since they represent the total effect of an increase in basic income on the total economy of a region. Thus, the original dollar is always counted. From Montana's point of view, this convention appears to overstate the true total income effect from the Northern Tier Pipeline Project. For example, suppose that a pipeline construction force in some Montana county (for example, Garfield), is nonlocal. By a strict accounting definition, all the payroll received for the construction of this segment of the pipeline is considered income to Garfield County. But no Montana resident receives this income, and only the portion which is locally spent affects the Montana economy. That portion of the original payroll remitted out-of-state must be subtracted from the total income effect.

The Northern Tier Pipeline Project will also have a long-term impact on the Montana economy. This impact results from the location of a permanent staff of 48 people in Montana to operate, maintain, and manage the system. In this case, the full, unadjusted income multiplier is employed; since the staff is expected to reside in Billings (Yellowstone County), their spending behavior should be no different than the average behavior represented in the unadjusted multiplier. Induced employment is estimated by dividing induced income by average annual earnings in Yellowstone County. Merchants will have sufficient time to respond to the additional business generated by this new work force, and additional jobs will result.

The effects of the pipeline project on employment during the construction period is much less clear. Pipeline construction workers will not stay in any one location for more than a few months. Merchants cannot justify capital investments or investments in training costs for new employees, so no significant induced construction period employment is expected.[1] The additional business at local retail and service establishments is apparently handled by working harder or by working overtime with present staff. Few additional staff will be hired. For this analysis the short-term induced employment impacts are deemed to be insignificant.[2]

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[1]This is consistent with the general findings of the Pipeline Construction Worker and Community Impact Surveys study (Moutain West Research, Inc. 1976), although it should be emphasized that no quantitative research on this issue was undertaken.

[2]For a more detailed discussion of why potential induced employment effects are not fully realized, see Mountain West Research, Inc., 1979.

TABLE 41. Adjusted Basic Income Multipliers

County of Income Destination	County of Income Origin						
	Sanders, Lake, or Mineral	Missoula	Powell or Granite	Lewis and Clark	Cascade	Hill	Construction Camp Regions
Sanders, Lake, or Mineral	1.14						
Missoula	.48	1.62					
Powell or Granite			1.14				
Lewis & Clark			.48	1.62			
Cascade					1.62	.22	
Hill						1.40	
Construction Camp Regions							1.51

Fiscal Impacts

The potential fiscal effects of the proposed project are listed below. Of these, some are temporary.

1) An increase in the tax base because of property tax revenues from the pipeline

2) Income taxes on the corporation, after the pipeline system is operational

3) State and local public services such as health, education, and road maintenance

4) Income taxes from construction and operation workers

5) Property taxes on workers' personal vehicles and on construction equipment and vehicles

6) Liquor and cigarette taxes

7) Fuel taxes

This analysis focuses on the fiscal impacts of property tax revenues, personal and corporate income taxes, and any identifiable changes in state and local public expenditures arising from the pipeline project.

Liquor and cigarette taxes are not considered, nor are property tax revenues from construction equipment and their corresponding fuel taxes. If the license fees and fuel taxes accurately reflect normal road maintenance costs, the additional taxes obtained from these sources should pay for the added wear and tear on the roads.

Property Taxes. For purposes of property taxation, Montana will assess the property of NTPC by the unit value method, which first values the entire system by three general concepts of value -- cost, income, and market value of the corporate enterprise. The specific use and definition of these three concepts vary with circumstances and the judgment of the assessor (International Association of Assessing Officers). To estimate the impacts of NTPS, cost is the most reasonable measure of system value. It is difficult to predict income or market values of a project several years in advance.

Costs easily identified and measured include all the costs of construction, equipment, materials, supplies, and any other costs necessary for the construction or operation of the pipeline system. The total cost of the pipeline system is estimated by NTPC to be $1.15 billion for the initial phase and an additional $42 million for system expansion in 1984 to its full capacity of 933,000 bpd. This estimate does not include interest during construction.

The next step in the valuation process is to determine the entire project's value to Montana. Of the three measures of value, only costs are considered here. Income and market value are not considered because the difficulty of allocating the income or market value of the corporation to specific states along the pipeline. Therefore, Montana's allocation of total system value is simply the share of costs incurred in Montana (Mountain West Research, Inc. 1979).

The state assessors will then apportion the Montana value to individual taxing districts along the route on the basis of pipeline miles and pipe diameter. The percentage of the total value of NTPS in Montana apportioned to each county is equal to the pipeline mileage times the pipe diameter in that county, divided by the state's total mileage times pipe diameter (weighted to account for differences in diameter). The county weighting factors are reported in table 42. County assessed value is thereby equal to the total Montana value times the county weighting factors times 0.16 (sixteen percent is the assessment ratio for centrally assessed public utilities).

Once assessed valuations are determined, they are multiplied by the appropriate mill levy to obtain the tax liability. The central issue here concerns which mill levies are most appropriate for the calculation of NTPC's property taxes. Since there are many overlapping taxing districts within each county, an average county rate has been estimated that takes account of the general avoidance of cities, towns, and other special taxing districts along NTPC's NTPR and the alternatives considered by the Department of Natural Resources and Conservation (table 43). This rate ignores city and town levies, and is therefore lower than an overall average county mill rate.

The schedule of proposed construction activity, figure 2, assumes that most of the project will be completed by January 1, 1981. The pipeline and pumping stations are scheduled to be completed by that date; the delivery facilities will only be about 79.3 percent complete. For the tax liability in 1981, only the costs incurred as of January 1, 1981 are counted for valuation. Thus, first year taxes are estimated by subtracting 20.7 percent of the estimated cost of delivery facilities from the total cost of the pipeline and Phase I facilities, multiplying the result by 0.16, then multiplying this amount by the county weighting factor and average rural mill levy for each county.[1]

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[1]The calculation is:

$$CTL = 0.16 * (TC - 0.207\ DFC) * CWF * CML$$

Where:

- CTL = county tax liability
- TC = total costs for the initial project phase in Montana
- DFC = delivery facilities costs
- CWF = county weighting factor

$$= \frac{\text{pipeline miles x diameter in county}}{\text{pipeline miles x diameter in state}}$$

$$= \frac{\text{pipeline miles x diameter in county}}{\text{42" x pipeline mile @ 42 in + 40 in x pipeline miles @ 40 in}}$$

- CML = average county rural mill levy

TABLE 42. County Weighting Factors.

(as percentage of total Montana System)

	Routes						
County	NTPR	DNRC	Hi-Line	Raynesford	Arlee	Knox Pass	St. Ignatius
Sanders	10.3	10.2	10.5	10.4	14.1	4.3	11.9
Mineral						10.1	
Lake					1.5		4.9
Missoula	11.5	11.9	13.4	13.4	7.4	9.3	4.6
Granite	2.3	4.4					
Powell	7.3	5.6	3.9	3.9	7.4	7.4	9.1
Lewis & Clark	5.1	5.0	7.5	7.5	5.2	5.2	5.2
Cascade			8.9	10.5			
Chouteau			10.6				
Hill			5.3				
Blaine			8.7				
Phillips			8.2				
Valley			8.7				
Daniels			7.5				
Sheridan			6.7				
Judith Basin				5.0			
Jefferson	0.2	0.2			0.2	0.2	0.2
Broadwater	7.1	7.1			7.2	7.2	7.2
Meagher	6.9	6.9			7.0	7.0	7.0
Wheatland	6.8	6.7			6.9	6.8	6.9
Golden Valley	2.9	2.9			2.9	2.9	2.9
Musselshell	2.6	2.6			2.6	2.6	2.6
Fergus	0.4	0.4		11.2	0.4	0.4	0.4
Petroleum	5.6	5.5		6.6	5.7	5.6	5.7
Garfield	13.0	13.2		13.6	13.2	13.0	13.2
McCone	8.6	5.9		6.1	8.7	8.6	8.7
Dawson	0.2	3.8		3.9	0.2	0.2	0.2
Richland	8.6	7.3		7.5	8.7	8.6	8.7
Roosevelt	0.5	0.5		0.5	0.5	0.5	0.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 43. Montana:

Average Rural Levies 1978-79

County	Average Rural Levy[1]	Minor Exclusion[2]	Total Average Rural Levy
Beaverhead	163.35		163.35
Big Horn	124.29	1.27	125.56
Blaine	152.22	10.50	162.72
Broadwater	164.07		164.07
Carbon	180.00	.23	180.23
Carter	166.18		166.18
Cascade	245.67	1.61	247.28
Choteau	161.38	.74	162.12
Custer	188.11	.75	188.86
Daniels	176.35	3.11	179.46
Dawson	186.68		186.68
Deer Lodge	285.33		285.33
Fallon	110.71		110.71
Fergus	163.85		163.85
Flathead	191.21		191.21
Gallatin	200.28	11.00	211.28
Garfield	153.60	1.20	154.80
Glacier	158.45		158.45
Golden Valley	154.15		154.15
Granite	168.24	2.00	170.24
Hill	182.59	13.00	195.59
Jefferson	226.14	2.20	228.34
Judith Basin	166.80	1.50	168.30
Lake	172.09	10.86	182.95
Lewis & Clark	209.12	12.22	221.34
Liberty	154.05	1.50	155.55
Lincoln	171.48	1.80	173.28
Madison	148.41		148.41
McCone	165.11	3.50	168.61
Meagher	162.36	1.50	163.86
Mineral	269.66	1.32	270.96
Missoula	215.04		215.04
Musselshell	132.67	.06	132.73
Park	183.60	6.70	190.30
Petroleum	128.61	1.00	129.61
Phillips	170.30	4.20	174.50
Pondera	162.57		162.57
Powder River	94.54	.20	94.74
Powell	156.02	12.25	168.27
Prairie	172.62	1.97	174.59
Ravalli	183.19	1.50	184.69
Richland	137.07	10.65	147.72

TABLE 43. (cont'd)

County	Average Rural Levy[1]	Minor Exclusion[2]	Total Average Rural Levy
Roosevelt	181.10	1.50	182.60
Rosebud	122.19	1.17	123.36
Sanders	154.48	.62	155.10
Sheridan	168.21	23.78	191.99
Silver Bow	269.21		269.21
Stillwater	171.09	.50	171.59
Sweet Grass	188.61	1.50	190.11
Teton	181.02	4.30	185.32
Toole	166.28	1.16	167.44
Treasure	146.54	1.35	147.89
Valley	172.73		172.73
Wheatland	183.86		183.86
Wibaux	132.06		132.06
Yellowstone	175.22	6.68	181.90

[1]Source: Montana Taxpayer's Association 1979. The average levies are computed by averaging the total mill levies across all school districts, excluding city school districts and city levels.

[2]Minor exclusions are those special district levies not included in the total school district levies. These are added back in by reference to Montana Property Tax Mill Levies 1978-79; Montana Taxpayer's Association and with judgment concerning their rural applicability.

During the construction phase, costs must be used for property tax valuation, but in subsequent years the unit value method allows other measures of value to be considered. The further into the future that tax revenues are forecast, the less accurate they will be. Two alternative projections are used in this analysis; the value of NTPS decreases in a straightline manner, 3-1/3 percent per year over a thirty year useful life of the facility (a conservation assumption); and, the value of NTPS remains constant over a thirty year projected useful life of the pipeline (a liberal assumption). State tax assessors probably will not adhere strictly to either projection. Rather, some more complex valuation process for determining tax revenues is more likely to result (Montana Department of Revenue 1979).

Personal Income Tax. Methods of estimating personal income were discussed in the previous section on economic impacts. For the purpose of income tax calculation, the total income impact of the Northern Tier Pipeline project taken from the economic impact analysis will be multiplied by 0.0348, which represents the average tax rate paid on gross income in Montana for 1977 (Montana Department of Revenue 1979). Since the payroll to construction workers and local purchases by contractors will induce income throughout the state and be received by people in all tax brackets, the best estimate of the applicable tax rate on this income is the average state income tax rate of 0.0348.

Corporate Income Taxes. This analysis is a hypothetical example of what corporate income taxes might be, not what they will be. The actual taxes will depend on the precise corporate structure of NTPC and the future of the oil industry, neither of which is known. However, for the sake of completeness this hypothetical example is presented.

Estimates of operations costs and revenues presented in BLM's Environmental Statement (USDI 1979) may be used as a basis for estimating NTPC's possible income. In addition, the financial and depreciation costs must be considered to make a gross estimate of the company's net income. The state of Montana taxes corporate net income at 6.75 percent. For an interstate corporation, the amount of net income taxable by Montana is calculated by a formula which equally weights -- one-third each -- Montana's proportion of sales, property, and payroll of the entire corporation. From the information contained in the DPA (NTPC 1978), these proportions are estimated at 0.20, 0.35, and 0.44 for sales, property, and payroll, respectively. Combining these factors results in a Montana tax on thirty-three percent of NTPC's net income.

The prediction of revenues beyond 1984 would be extremely tenuous. Therefore, no attempt was made to project corporate income tax revenues over the life of the project.

Public Expenditures. Fiscal impact analysis must consider both the changes in public revenues and the costs due to a proposed project. This pipeline project will have many identifiable effects of state and local revenues, but the effects of NTPC on public expenditures is much less clear. The procedure followed by this report is to identify any potential problems produced by the pipeline project, estimate the type of public action required to remedy the situation, and then make a cost estimate of the required action incorporating the advice of the responsible public officials wherever possible.

IMPACTS ON SERVICES AND FACILITIES

Public Services and Facilities

This section briefly reviews the methods used to identify and evaluate impacts on public services and facilities in communities along the alternative routes. The areas covered are:

1) Education

2) Health

3) Public Safety

4) Recreation

5) Transportation

Impacts on Education. Impact on the local level is determined by demand of workers' school-age children on the available staff in the affected school systems as of the 1976/77 school year (the last year for which such data are available). Student/staff ratios are computed, by county, for both baseline and impact conditions; the county ratios are compared to the state ratios. If the county ratio is less than the state ratio, excess capacity is presumed to exist. No impacts will occur where school-age population influxes occur during summer vacations.

The level of impact is defined as insignificant when capacity exceeds demand and moderate when demand exceeds capacity, but the student/staff ratio rises no more than five percent. Significant impact occurs when demand exceeds capacity, and the student/staff ratio rises by more than five percent.

Route level or statewide impacts are determined in two ways: (1) if there is an increase in the student/staff ratio above that of Montana, that impact is defined as moderate or insignificant based on the percentage increase indicated above; (2) the number of moderate and significant impacts per county along the route are summed.

Impacts on Health. It is presumed that a health care system which can service most needs required by construction workers and their families will consist of: acute-care services, outpatient services, and emergency care, which are measured by these criteria: (1) number of acute-case hospital beds (acute-care services), (2) number of physicians with active practice (outpatient services), and (3) number of ambulance attendants (emergency care). These criteria are considered on a per-population basis.

County health systems differ in their facilities and capabilities. In general, rural counties have low ratios of hospital beds and physicians per population, but have high ratios of ambulance attendants. It is difficult to compare county health care components to a state or national standard. Health care impacts are measured by the increased demand caused by construction workers and their families.

The level of impact is considered as insignificant when the percentage increase is not more than five percent, moderate when the percentage increase is from six percent to ten percent, and significant when the percentage increase is over ten percent.

For the routes, impacts are determined by adding the number of moderate and significant impacts along alternative routes. These are then compared among routes.

Public Safety. There is little evidence that pipeline construction and its workers have a significant adverse impact on law enforcement and fire protection. However, recognizing that a large number of outsiders may create some problems in bars of the smaller towns (less than 2000 population), appropriate mitigation measures for law enforcement purposes will be recommended, though they may not be needed. Fire protection systems and fire fighting equipment are required elements of the completed pipeline system. Because of the limited capacity of the volunteer fire departments typical outside of urban centers it will be important that strict fire protection procedures be observed at storage yards, warehouses, and camps.

Recreation. Pipeline workers typically work six ten-hour days per week. Their use of developed recreation areas would be limited to daytrips and is expected to be minimal. More significant may be the use of private recreation areas for lodging by that proportion of the work force that typically relies on RVs, travel trailers, and campers. Evidence from other pipeline projects is that nearly one-quarter of the nonlocal work force uses such vehicles, in this case nearly 100 workers per construction spread. Most impact on public recreation areas may be due to the disruption, noise, air pollution, and visual effects caused by the construction process.

Transportation. Pipeline construction necessitates the movement of heavy equipment, large amounts of material, and workers on Montana's roads and highways. Pipeline road crossings will trench or bore under roads probably impeding traffic. These impacts will occur statewide. Worst cases can be identified and the effect on traffic flows calculated. By discussion with state and local highway officials, the magnitude of the transportation impacts can be ascertained and mitigation strategies decided upon.

Commercial and Other Services

The community impact surveys taken for the present study indicate that local residents expect little impact on commercial services resulting from an influx of nonlocal workers. Primary data support this conclusion. The results of surveys of five small communities (in Montana, North Dakota, and Alberta, Canada) which had significant influx of nonlocal pipeline workers report most impact on motels (Mountain West Research, Inc. 1979), restaurants, bars, banks, service stations and repair shops. Restaurants reported overcrowding in the evenings. To catch the early morning pipeliner business, some restaurants opened earlier; pipeline workers often left for work before 7:00 a.m. Similarly, one bank extended its working hours on the pipeliners' payday, remaining open later than usual to enable the workers to cash their checks. Service stations

and repair shops reported increased business. The only negative impact was associated with overcrowding; some local customers complained of poor service.

None of these impacts, reported in communities with populations of 2600 to 8300 persons, cause any serious problems. In larger cities, impacts can be expected to be even less noticeable. Since primary data indicate that impacts upon commercial services can be expected to be minimal, they are not dealt with here.

CHAPTER FOUR

SHORT-TERM AND LONG-TERM IMPACTS

The most significant socioeconomic impacts due to large-scale projects such as Northern Tier are the short-term impacts -- those that occur during the construction period.

The impacts considered in this study are:

-- demographic

-- lodging/housing

-- economic

-- fiscal

-- public and commercial services

-- transportation

-- developed recreation areas

Of these impacts, lodging/housing will be the most severe; the fiscal effects will be the dominant beneficial impact.

DEMOGRAPHIC IMPACTS

Impacts on population due to the construction of the NTPS will occur according to the timing of Northern Tier's work schedule. The temporary population influx resulting from the project will vary by month and location. Surveys of other pipeline projects show that few secondary jobs result from pipeline construction. If such jobs develop, they are likely to be filled by local people. Thus, the demographic impact estimates are concerned with non-local construction workers and their accompanying families.

Along most route alternatives, the maximum population impact would be about 640 persons in Missoula and Helena during June 1980. Moreover, according to the proposed NTPS construction schedule, the demographic impact on both cities, from April through September, would be in excess of 600 persons per month. Because Missoula and Helena have good lodging capacity and are located within commuting distance of the end point of one construction spread and the starting point of another, as well as in proximity to pump stations, they can expect varying levels of pipeline-related population influx over a ten-month period (February to November 1980).

Maximum population impact varies for the DNRC Modified Route and for the Knox Pass and Arlee routes. In each of these alternatives, it is possible that

Missoula will be the lodging base for workers commuting to the pipeline construction site on both sections 5 and 6: average maximum population impact for any of these three routes is 1,114 persons during May or June.

Other communities located within commuting distance to pump station/delivery facility sites, such as Harlowton and Sidney or Great Falls and Plentywood, can anticipate nonlocal population impacts lasting up to fourteen months. Still others along the route alternatives are either beyond the maximum commuting distance to the spread for nonlocal workers or lie within the commuting zone of larger urban centers such as Missoula, Helena, and Great Falls. In either case, no significant demographic impact is predicted for them.

Tables 44 to 48 summarize the forecast population influx (nonlocal workers, spouses, and children) to specified geographic areas by month for each route alternative. The peak demographic impacts anticipated from the project for each county in terms of total population, nonlocal workers, spouses, and children (by age group) are shown in tables 49 to 53 for the NTPR, Hi-Line, and Raynesford alternatives.

NTPR

Previously referenced tables 44 and 49 present the estimated demographic impacts for the NTPR.

Sanders County. Impacts from the construction of sections 4 and 5 and from the pump station at Paradise will be experienced in eastern Idaho and in Sanders County ("WEST" in table 44) from February through May (section 5 plus the Paradise station) and from September-November 1980 (section 4 plus Paradise). The total impact on the West section varies from a low of twenty-two persons in November to a peak of 601 persons in September -- the monthly average is about 364 nonlocals. Taking account of available transient lodging, Sanders County would have to accommodate a peak population influx of 286 persons, including thirty-six spouses and twenty-three school-age children. The remainder of the nonlocal pipeline impact would be lodged in Idaho.

Missoula County. The city of Missoula is expected to lodge population associated with pump stations (Paradise and Potomac) as well as with pipeline construction sections 5 and 6 over a ten-month period. Total influx varies from thirty-nine persons in February to 643 persons in June, with an average monthly impact of nearly 460. During the June peak, eighty-one spouses and sixty-seven children under eighteen would accompany the nonlocal pipeline work force.

Powell County. Because of its proximity to Missoula and Helena, Powell County is not expected to experience any significant population impact. However, a few nonlocal workers and their families might choose to reside in the Deer Lodge locale for one to two months.

Lewis and Clark County. The next logical choice of nonlocal workers would be Helena. Given its geographic location with respect to two pump stations (Helmville and Townsend) and pipeline construction sections 6 and 7, Helena can

TABLE 44. Total Population (Tot Pop) Influx, NTPR.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST														
Workers	12	229	453	453				463	327	17				
Spouses	4	37	74	74				75	53	3				
Children	3	31	61	61				63	44	2				
Tot Pop	29	297	588	588				601	424	22				
MISSOULA														
Workers	30	237	477	493	494	487	473	475	339	31				
Spouses	5	39	78	80	80	79	77	77	55	5				
Children	4	32	64	67	67	66	64	64	46	4				
Tot Pop	39	308	619	640	641	632	614	617	440	40				
HELENA														
Workers	30	246	487	44	491	483	469	471	335	31				
Spouses	5	40	79	7	80	79	76	77	55	5				
Children	4	33	66	6	66	65	64	64	45	4				
Tot Pop	39	319	632	57	637	627	609	612	435	40				
TOWNSEND-WHITE SULPHUR SPRINGS														
Workers				459	208									
Spouses				75	34									
Children				62	28									
Tot Pop				596	270									
HARLOWTON														
Workers	12	28	36	42	292	506	323	281	222	58	39	34	24	16
Spouses	2	5	6	7	48	82	53	46	36	9	6	6	4	3
Children	2	4	5	6	39	68	44	38	30	8	5	4	3	2
Tot Pop	16	36	47	55	379	657	419	365	288	75	51	44	31	21

TABLE 44. (cont'd)

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROUNDUP														
Workers							166	175	132	8				
Spouses							27	29	22	1				
Children							22	24	18	1				
Tot Pop							215	227	171	10				
JORDAN														
Workers	28	227	447	254	252	132	19	22	22	7				
Spouses	5	37	73	41	41	22	3	4	4	1				
Children	4	31	60	34	34	18	3	3	3	1				
Tot Pop	36	295	580	330	327	171	25	29	29	9				
CIRCLE														
Workers				210	210	195	195	195	85					
Spouses				34	34	32	32	32	14					
Children				28	28	26	26	26	11					
Tot Pop				273	273	253	253	253	110					
EAST														
Workers	18	47	62	77	75	164	247	250	266	99	62	54	48	13
Spouses	3	8	10	13	12	27	40	41	44	16	10	9	8	2
Children	2	6	8	10	10	22	34	33	35	14	8	7	6	2
Tot Pop	23	61	80	100	97	213	321	324	345	129	80	70	62	17

TABLE 45. Total Population (Tot Pop) Influx, DNRC Modified Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST)	See table 44.													
MISSOULA														
Workers	30	237	438	322	763	484	473	475	339	31				
Spouses	5	39	71	52	124	79	77	77	55	5				
Children	4	32	59	43	103	65	64	64	46	4				
Tot Pop	39	308	569	418	990	628	614	617	440	40				
DEER LODGE														
Workers			37	25	31	81	80	64						
Spouses			6	4	5	13	13	11						
Children			5	3	4	11	11	9						
Tot Pop			48	32	40	105	104	84						
HELENA														
Workers	30	246	487	190	182	402	389	407	335	31				
Spouses	5	40	79	31	30	66	63	66	55	5				
Children	4	33	66	26	24	54	53	55	45	4				
Tot Pop	39	319	632	247	236	522	505	528	435	40				
TOWNSEND-WHITE SULPHUR SPRINGS)														
HARLOWTON)	See table 44.													
ROUNDUP)														
JORDAN)														
CIRCLE														
Workers	17	38	50	272	271	328	359	361	45	61	50	44	31	11
Spouses	3	6	8	44	44	53	59	59	7	10	8	7	5	2
Children	2	5	7	37	37	44	48	48	6	8	7	6	4	1
Tot Pop	22	49	65	353	352	426	466	468	58	79	65	57	40	14
EAST														
Workers	4	9	12	15	14	76	83	84	306	31	12	10	7	2
Spouses	1	2	2	2	2	13	14	14	50	5	2	2	1	1
Children		1	2	2	2	10	11	11	41	4	2	2	1	
Tot Pop	5	12	16	19	18	99	108	109	397	40	16	13	9	3

TABLE 46. Total Population (Tot Pop) Influx, Hi-Line Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST														
Workers	22	229	453	453				463	327	17				
Spouses	4	37	74	74				75	53	3				
Children	3	31	61	61				63	44	2				
Tot Pop	29	297	588	588				601	424	22				
MISSOULA														
Workers	30	237	476	492	495	487	473	475	339	31				
Spouses	5	39	78	80	81	79	77	77	55	5				
Children	4	32	64	66	67	66	64	64	46	4				
Tot Pop	39	308	618	639	643	632	614	617	440	40				
HELENA														
Workers	4	6	14	22	469	465	458	245	167	7				
Spouses	1	1	2	4	77	76	75	40	27	1				
Children		1	2	3	63	63	61	33	23	1				
Tot Pop	5	8	18	29	609	604	594	318	217	9				
GREAT FALLS														
Workers	32	238	451	457	249	37	30	255	189	66	39	34	24	16
Spouses	6	39	74	75	41	6	5	42	31	11	7	6	4	3
Children	4	32	60	61	33	5	4	34	25	10	5	4	3	2
Tot Pop	42	309	585	593	323	48	39	331	245	87	51	44	31	21
HAVRE														
Workers	24	225	14	22	228	402	395	396	302	24				
Spouses	4	37	2	4	37	66	64	65	49	4				
Children	3	30	2	3	31	54	54	53	41	3				
Tot Pop	31	292	18	29	296	522	513	514	392	31				

TABLE 46. (cont'd)

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HARLEM														
Workers			213											
Spouses			35											
Children			29											
Tot Pop			276											
MALTA														
Workers	4	6	193	385	21	17	10	11	11	7				
Spouses	1	1	31	63	3	3	2	2	2	1				
Children		1	26	52	1	2	1	1	1	1				
Tot Pop	5	8	251	500	27	22	13	14	14	9				
SACO														
Workers			28	57	420									
Spouses			5	9	68									
Children			4	8	57									
Tot Pop			36	74	545									
SCOBEY														
Workers						390	161	161	120					
Spouses						64	26	26	20					
Children						53	22	22	16					
Tot Pop						506	209	209	156					
PLENTYWOOD														
Workers	17	41	39	45	44	50	272	273	224	90	62	44	38	13
Spouses	3	7	6	7	7	8	44	44	37	15	10	7	6	2
Children	2	6	5	6	6	7	37	37	30	12	8	6	5	2
Tot Pop	22	53	51	58	57	65	353	354	291	117	81	57	49	17

TABLE 47. Total Population (Tot Pop) Influx, Raynesford Route.

	Construction Months													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WEST)														
MISSOULA)	See table 46.													
HELENA)														
GREAT FALLS														
Workers	32	239	452	394	41	37	30	255	189	66	39	34	24	16
Spouses	5	39	74	66	7	6	5	42	31	11	7	6	4	3
Children	5	32	61	53	5	5	4	34	25	10	5	4	3	2
Tot Pop	42	310	587	511	53	48	39	331	245	87	51	44	31	21
DENTON-WINNETT														
Workers				66	416	386	386	386	292	17				
Spouses				11	68	63	63	63	48	3				
Children				4	56	52	52	52	39	2				
Tot Pop				87	540	501	501	501	379	22				
JORDAN)	See table 44.													
CIRCLE														
Workers	17	38	50	272	271	328	359	361	45	61	50	44	31	11
Spouses	3	6	8	44	44	53	59	59	7	10	8	7	5	2
Children	2	5	7	37	37	44	48	48	6	8	7	6	4	1
Tot Pop	22	49	65	353	352	426	466	468	58	79	65	57	40	14
EAST														
Workers	4	9	12	15	14	76	83	84	306	31	12	10	7	2
Spouses	1	2	2	2	2	13	14	14	50	5	2	2	1	1
Children		1	2	2	2	10	11	11	41	4	2	1	1	
Tot Pop	5	12	16	19	18	99	108	109	397	40	16	13	9	3

TABLE 48. Total Population (Tot Pop) Influx, Knox Pass, Arlee, and St. Ignatius Routes

	Construction Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KNOX PASS														
WEST														
Workers	26	234	466	22	21	17	10	474	338	24				
Spouses	4	38	76	4	3	3	2	77	55	4				
Children		32	63	3	3	2	1	64	46	3				
Tot Pop	34	304	605	29	27	22	13	615	439	31				
MISSOULA														
Workers	22	225	449	901	452	452	452	452	316	17				
Spouses	4	37	73	147	74	74	74	74	52	3				
Children	3	30	61	122	61	61	61	61	43	2				
Tot Pop	29	292	583	1169	587	587	587	587	410	22				
ARLEE														
WEST														
Workers	26	233	465	22	21	17	10	474	338	24				
Spouses	4	38	76	4	3	3	2	77	55	4				
Children	4	31	63	3	3	2	1	64	46	3				
Tot Pop	34	302	604	29	27	22	13	615	435	31				
MISSOULA														
Workers	26	231	463	922	493	468	461	462	326	24				
Spouses	4	38	75	150	80	76	75	75	53	4				
Children	4	31	63	124	67	63	62	62	44	3				
Tot Pop	34	300	601	1197	640	608	598	600	423	31				
ST. IGNATIUS														
WEST														
Workers	30	239	479	495	463	433	20	485	349	31				
Spouses	5	39	78	81	75	71	3	79	57	5				
Children	4	32	65	67	63	58	3	65	47	4				
Tot Pop	39	310	622	643	601	562	26	630	453	40				
MISSOULA														
Workers	22	225					451	451	315	17				
Spouses	4	37					74	74	51	3				
Children	3	30					61	61	43	2				
Tot Pop	29	292					585	585	409	22				
SEELEY LAKE - LINCOLN														
Workers	4	6	194	185	51	69	10	11	11	7				
Spouses	1	1	32	30	8	11	2	2	2	1				
Children		1	26	25	7	9	1	1	1	1				
Tot Pop	5	8	252	240	66	90	13	14	14	9				
DRUMMOND														
Workers			269	286										
Spouses			44	47										
Children			36	39										
Tot Pop			349	371										
HELENA														
Workers	30	246	487	44	491	483	469	471	235	31				
Spouses	5	40	79	7	80	79	76	77	38	5				
Children	4	33	66	6	66	65	63	64	32	4				
Tot Pop	39	319	632	57	637	627	609	611	305	40				

TABLE 49. Peak Population Impact, NTPR.

COUNTY	WORKERS	SPOUSES	CHILDREN			TOTAL
			5 yrs. and younger	6-13 yrs.	14 yrs. +	
Sanders	220	36	7	15	8	286
Missoula	495	81	15	34	18	643
Powell						
Lewis & Clark	494	80	15	34	18	641
Jefferson						
Broadwater	115	19	4	8	4	149
Meagher	344	56	11	23	12	447
Wheatland	506	82	16	34	18	657
Golden Valley						
Musselshell	166	27	5	11	6	215
Fergus	49	8	1	4	2	64
Petroleum						
Garfield	447	73	14	30	16	580
McCone	210	34	7	14	7	273
Richland	127	21	4	8	4	165
Roosevelt	139	23	4	9	5	180

TABLE 50. Peak Population Impact, DNRC Modified Route.

COUNTY	WORKERS	SPOUSES	CHILDREN			TOTAL
			5 yrs. and younger	6-13 yrs.	14 yrs. +	
Sanders	)	See table 44.				
Missoula	763	124	40	52	26	990
Granite						
Powell	81	13	2	6	3	105
Lewis & Clark	487	79	16	33	17	632
Jefferson	)					
Broadwater	)					
Meagher	)					
Wheatland	)					
Golden Valley	)	See table 44.				
Musselshell	)					
Fergus	)					
Petroleum	)					
Garfield	)					
McCone	361	59	11	24	13	468
Richland	259	42	8	16	11	335
Roosevelt	47	8	1	3	2	72

TABLE 51. Peak Population Impact, Hi-Line Route.

COUNTY	WORKERS	SPOUSES	CHILDREN			TOTAL
			5 yrs. and younger	6-13 yrs.	14 yrs.+	
Sanders	220	36	7	15	8	286
Missoula	495	81	15	34	18	643
Powell						
Lewis & Clark	469	77	15	32	16	609
Cascade	457	75	14	31	16	593
Chouteau						
Hill	402	66	13	27	14	522
Blaine	213	35	7	15	7	276
Phillips	442	72	15	30	15	574
Daniels	390	64	13	31	13	506
Sheridan	273	44	9	19	9	354

TABLE 52. Peak Population Impact, Raynesford Route.

COUNTY	WORKERS	SPOUSES	CHILDREN			TOTAL
			5 yrs. and younger	6-13 yrs.	14 yrs +	
Sanders	220	36	7	15	8	286
Missoula	495	81	15	34	18	643
Powell						
Lewis & Clark	469	77	15	32	16	609
Cascade	452	39	8	16	8	587
Judith Basin						
Fergus	416	68	13	28	15	540
Petroleum	31	5	1	2	1	41
Garfield	420	68	13	29	15	545
McCone	361	59	11	24	13	468
Richland	259	42	8	16	11	335
Roosevelt	47	8	1	3	2	72

TABLE 53. Peak Population Impact, Knox Pass, Arlee, and St. Ignatius Routes.

COUNTY	WORKERS	SPOUSES	CHILDREN			TOTAL
			5 yrs. and younger	6-13 yrs.	14 yrs. +	
			KNOX PASS			
Sanders	126	21	4	9	4	164
Mineral	179	29	6	12	6	232
Missoula	901	147	29	61	32	1169
			ARLEE			
Sanders	131	21	4	9	5	170
Lake	81	13	2	6	3	105
Missoula	922	150	30	63	32	1197
			ST. IGNATIUS			
Sanders	252	41	8	17	9	327
Lake	270	44	9	18	9	350
Missoula	462	75	15	31	16	600
Powell	14	2		1	1	18
Granite	286	47	9	20	10	371
Lewis & Clark	559	91	18	38	19	726

anticipate impacts of similar proportion and timing to those in Missoula. Total population influx varies from thirty-nine persons in February to 641 in June with an average monthly impact of about 400. More than 600 pipeline-related persons are forecast to be present in the Helena area over the five-month period April-September 1980. During the June peak, an average of eighty spouses and sixty-seven children under eighteen would accompany the nonlocal pipeline work force.

Jefferson County. Due to their proximity to Helena, Jefferson County communities are not expected to receive any significant impacts.

Broadwater, Meagher, Wheatland, Golden Valley, and Musselshell counties. Significant temporary impacts are forecast for a wide area along section 7 including Townsend, White Sulphur Springs, Harlowton, and Roundup. These impacts range from twenty-two persons in Roundup in November to 596 persons at successive points along the section from May through September. Based upon the distribution of lodging facilities, the counties in this area will experience the following peak population impact.

TABLE 54. Population Impact on Pipeline Section 7.

County	Total Population	Spouses	School-Age Children
Broadwater	149	19	12
Meagher	447	56	35
Wheatland	657	82	52
Golden Valley	nil	nil	nil
Musselshell	215	27	17

Wheatland County is forecast to receive an influx of from sixteen persons in February to 657 persons in July due to construction of a pump station and the Glacier delivery facility near Harlowton, as well as pipeline section 8. The average monthly total of nonlocals commuting to the job site from Harlowton would be about 137 persons.

Petroleum County. No population impact is anticipated.

Garfield County. With no mitigating measures, Jordan would experience an influx of from nine persons in November to 580 persons in April due to construction of pipeline section 8 and pump station 17. The average population impact would be around 183 persons, assuming that lodgings could be found for them.

McCone County. Lodging facilities in Circle could accommodate an average of 172 persons associated with the pipeline construction activities on section 8 and perhaps pump station 17 at Jordan. A maximum of around 273 persons (including thirty-four spouses and twenty-eight children) would seek to locate in Circle during May 1980. The minimum would be 110 persons at the end of construction in November. The highest potential levels of population influx would occur in a five-month period.

Dawson County. No significant population impacts are anticipated.

Richland and Roosevelt counties. The area of the NTPR entitled "EAST" in table 44 will receive impacts associated with pump station 18, the Western Pipeline delivery facility and the eastern fourth of construction on section 8. The total impact will range from seventeen persons in March 1981 to 345 persons in October 1980 and be distributed among such communities as Sidney, Fairview, Poplar, and Wolf Point. Based upon the lodging available, 165 people would try to locate in Richland County communities, while the remaining 180 would probably locate in Roosevelt County (including twenty-three spouses and fourteen school-age children).

DNRC Modified Route

Tables 45 and 50 present demographic impacts along the DNRC Modified Route. The impacts on all communities along section 7 and with Jordan along section 8 are identical to those of the NTPR.

Sanders County. Impacts from the construction of sections 4D and 5D will be experienced in eastern Idaho and in Sanders County ("WEST" in table 46) from February through May (section 5D), and from September through November (section 4). Total impact in the "WEST" area varies from twenty-two persons in November to 601 persons in September; average population influx is 286 persons. A maximum of 236 persons associated with the construction of section 5D would seek to locate in Sanders County (Thompson Falls, Hot Springs, and Plains). Included in that maximum impact are thirty-six spouses and twenty-three school-age children.

Missoula County. Impacts for Missoula County are similar to most of the NTPR, except that an overlap of workers commuting to two pipeline sections is likely to take place in June. Missoula County will be affected by sections 5D (June through November) and 6D (February through June) and pump stations 1N and 2N. Demographic impact will vary from thirty-nine persons in February to 990 persons in June, averaging 460 persons per month. The maximum demographic impact in June includes 124 spouses and eighty-eight children.

Granite County. No significant population impacts are anticipated.

Powell County. A portion of the nonlocal workers on section 6D are expected to lodge in Deer Lodge from April through September. Resulting demographic impact will vary from thirty-two persons in May to 105 persons in June, averaging sixty-seven persons monthly. The peak population is anticipated to include thirteen spouses and nine school-age children.

Lewis and Clark County. Helena can expect workers on sections 6D (May through November) and 7D (February through April), and pump stations 3N and 4N. Population will vary from thirty-nine persons in February to 632 persons in April. Average monthly impact will be 350 persons. Peak population will include seventy-nine spouses and fifty school-age children. Between July and September, over 500 nonlocals will attempt to locate in the city.

Broadwater, Meagher, Wheatland, Golden Valley, Musselshell, Petroleum, and Garfield counties.

Impacts identical to those of the NTPR are expected.

McCone County. Pipeline section 8D, and the pump station and delivery facility near Enid are forecast to cause an influx of from fourteen persons (March 1981) to 468 persons (September 1980) in Circle. Between May and September, average influx is forecast to be 413 persons. The peak population estimate includes fifty-nine spouses and thirty-seven school-age children.

Richland and Roosevelt counties. That area entitled "EAST" (which includes the cities of Poplar, Fairview, and Sidney) in table 46 will experience a population impact from pipeline section 8D and the pump station and delivery facility near Enid. The impact will range from three persons in March 1981 to 397 persons in October 1980; average influx is forecast to be sixty-two persons. It is possible that both fixed-site workers (for the duration of the project) and pipeline workers (from approximately July 18 to August 9 and from August 23 to September 20) can commute from Glendive in Dawson County. In each of these cases, Glendive is sixty miles from the construction site, farther than either Circle, Poplar, Fairview, or Sidney. Probably families of construction workers will locate in Glendive, and workers themselves will not commute daily. However, like other communities in eastern Montana, Glendive is attracting its share of workers associated with oil and gas activity, and housing is short (Western Coal Planning Assistance Project 1979).

Hi-Line Route

Tables 46 and 51 summarize the demographic impacts forecast along the Hi-Line Route alternative. Construction in Sanders, Missoula, and Powell counties will have impacts identical to those occurring along the NTPR, with the exception that a few workers might locate in the vicinity of Ovando.

Lewis and Clark County. Construction of the Hi-Line alternative would create demographic impacts on Helena from two sources: construction section 6H while the spread is within commuting distance (from approximately mid-May through August) and pump station 3H (east of Ovando) from February to November. The peak population influx would occur in June with about 609 nonlocals, including seventy-seven spouses and sixty-three children, and only slightly smaller numbers of people in July and August.

Cascade County. Great Falls will experience a population influx from construction on the Hi-Line similar to that at Missoula. The sources of this influx will be construction section 6H and 7H as well as pump station 4H and the Glacier Pipeline delivery facility. The forecast total influx ranges from a high of 593 persons in May 1980 to a low of twenty-one persons in March 1981 for month 14. The average impact during this period is 196 persons, although peak and near-peak impact levels are likely to persist in April and May, and again in September.

Choteau County. No population impact is expected due to the proximity of both Great Falls and Havre. However, the possibility of some nonlocal workers locating in the Fort Benton area for one to two months should not be excluded.

Hill County. The construction of section 7H and 8H together with the erection of a pump station south of Havre (5H) will produce a population impact ranging from thirty-one persons in February and November, to over 520 persons in July. In fact, if the proposed construction schedule is followed, a nonlocal population influx of over 500 persons can be anticipated from July through September.

Blaine County. Harlem, in Blaine County, will experience a temporary increase in population due to construction on section 8H. A peak of 276 nonlocals is forecast to be present in the region during April 1980. Included in that group will be about thirty-five spouses and twenty-two school-age children.

Phillips County. Pipeline section 8H and pump station 7H are forecast to cause a population influx ranging from five persons in February to 500 persons in May, with an average monthly influx of eighty-six persons. Most of the impact will occur in April and May. The peak population of 500 persons includes sixty-three spouses and fifty-two children. Pipeline section 8H will cause a three-month impact in Saco, ranging from thirty-six persons in April to 545 persons in June. Peak population will include approximately sixty-eight spouses and fifty-seven children. The peak number of children temporarily lodging in Phillips County will be forty-five children in June.

Valley County. No population impacts are anticipated; Glasgow is barely within commuting distance of pipeline section 8H which is scheduled for June and July.

Daniels County. Pipeline section 8H is forecast to cause a four-month population influx in Scobey, ranging from 506 persons in July to 156 persons in October. Peak population includes sixty-four spouses and forty-four school-age children.

Sheridan County. Pipeline section 8H, pump station 9H, and the delivery facility near Plentywood will cause a population increase for a fourteen-month period, from seventeen persons in March 1981 to 354 persons in September 1980. Average monthly influx is forecast to be 117 persons. The peak population influx in September will include forty-four spouses and twenty-eight school-age children.

Raynesford Route. The Raynesford Route alternative shares sections of the NTPR, DNRC Modified, and Hi-Line routes. Demographic impacts for Sanders, Missoula, and Powell counties will be identical with those on the NTPR; the impacts in Lewis and Clark County will be the same as on the Hi-Line Route; and those in Garfield, McCone, Dawson, Richland, and Roosevelt counties will be identical to the DNRC Modified Route impacts. Tables 47 and 52 summarize the forecast demographic impacts for the Raynesford alternative.

Cascade County. Great Falls will experience population impacts caused by the construction of pump station 4L and the Glacier Pipeline delivery facility[1] as well as of pipeline sections 6H and 7L. The influx is forecast to range from 587 persons in April to thirty-nine persons in August 1980 with an average monthly impact of 154. Over 300 nonlocals are anticipated during March to May and again during September and October, while less than sixty are forecast over the summer (June to August).

Judith Basin County. Because it is within commuting distance of both Great Falls and Lewistown, construction of the Judith Basin portion of section 7L is not forecast to cause significant demographic impact on communities in that county.

Fergus and Petroleum counties. Between May and October 1980, construction of section 7L will bring pipeline-related population increases to the area between Denton, Fergus County, and Winnett, Petroleum County. Those increases will range from twenty-two to 540 persons, with the latter peak occurring in July, focused on Lewistown. The average monthly influx is forecast at about 370 persons. Petroleum County will experience little impact -- a peak of about forty-one persons -- due to the absence of lodging facilities there. Workers constructing the section in Petroleum County are expected to commute to the spread from Lewistown.

Knox Pass Route

The Knox Pass Route differs from the NTPR along both sections 4 and 5. Tables 48 and 53 summarize demographic impacts along the Knox Pass Route.

Sanders and Mineral counties. "WEST" in table 48 presents demographic impacts in the area including eastern Idaho, Sanders, and Mineral counties. The area is affected by pipeline section 4K (September through November) and section 5K (February through April), and pump station 1K near Thompson Falls. As on the NTPR, two peaks occur, one in April and one in September. Population will vary from thirteen persons in August to 615 persons in April. Average monthly influx will be 212 persons. Sanders County (Thompson Falls and Plains) will experience a peak influx of 164 persons in September from construction on section 4K and pump station 1K. Its peak includes twenty-one spouses and thirteen school-age children. Mineral County (DeBorgia, St. Regis, Saltese, Superior, and Alberton) will experience a peak of 232 persons in April from construction of section 5K. Its peak includes twenty-nine spouses and eighteen school-age children.

Missoula County. The population associated with pipeline sections 5K and 6 and pump station 13 (on section 6) will attempt to locate in Missoula. Workers can commute from Missoula to the construction site from May through November on section 5K and from February through May on section 6. As a result

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[1]These combined facilities are in a different location from where they would be on the Hi-Line.

an overlap is expected in May, with an impact of 1169 persons. From April through September, the nonlocal population is expected to be over 580 persons. Average monthly nonlocal population will be 485 persons. The peak population is expected to include 147 spouses and ninety-three school-age children.

Arlee Route

The Arlee Route differs from the NTPR only along section 5. Tables 48 and 53 summarize population impacts.

Sanders and Lake counties. "WEST" in table 48 presents demographic impacts in the area that includes eastern Idaho and Sanders and Lake counties. Impacts will occur from pipeline section 4 (September through November) and section 5A (February through April) and from pump station 1S east of Plains. The population influx is very similar to that of the Knox Pass alternative. Peaks will occur in April and September. The influx will vary from thirteen persons in August to 615 persons in September. Average monthly influx is expected to be 211 persons. The peak impact in Sanders County will be 170 persons in April, resulting from construction of section 5A and pump station 1S.

Thompson Falls, Plains, and Hot Springs will be affected. Peak population will include twenty-one spouses and fourteen school-age children. Lake County is expected to experience a peak of 105 persons, also in April, as a result of nonlocal workers in section 5A. Ravalli, Ronan, and Polson will be affected. The peak population includes thirteen spouses and nine school-age children.

Missoula County. Nonlocals associated with pipeline sections 5A (May through November) and 6 (February through May) and pump station 1A north of Arlee can be expected to stay in Missoula. Population influx will range from thirty-one persons in November to 1197 persons in May, due to the overlap in pipeline section work. Average monthly influx is anticipated to be 503 persons; from April through September, average population is 707 persons. Peak population is in May is expected to include 150 spouses and ninety-five school-age children.

St. Ignatius Route

The St. Ignatius Route differs from the NTPR along sections 5 and 6. Tables 48 and 53 present population impacts for Sanders, Lake, Missoula, Powell, Granite, and Lewis and Clark counties associated with the St. Ignatius Route.

Sanders and Lake counties. Population influx in eastern Idaho, Sanders, and Lake counties will result from construction on pipeline section 4 (September through November) and section 5S (February through July) and pump stations 1S (near Plains) and 2S (near St. Ignatius). Nonlocal population influx is expected to vary from twenty-six persons in August to 643 persons in May, averaging 393 persons per month. Unlike the situation on all other routes, commuting from Missoula is restricted for the St. Ignatius Route on both sections 5S and 6S. Consequently, with the exception of August, "WEST" will experience an average influx of 612 nonlocals between April and September.

The peak population influx in Sanders County will occur in June, due to construction on sections 5S and pump station 1S. Plains, Hot Springs, and Thompson Falls will be affected. In June, 327 persons, including forty-one spouses and twenty-six children, will attempt to locate in Sanders County communities. Lake County communities -- Polson, Ravalli, St. Ignatius, and Ronan -- will have a peak influx of 350 persons, including forty-four spouses and twenty-seven children, in July, an influx caused by construction of sections 5S and pump station 2S.

Missoula, Powell, and Lewis and Clark counties. Missoula is out of commuting distance to both pipeline sections and pump stations from April through August. Its population influx will be caused by section 6S during February and March and by section 5S during August through November. Nonlocal population is expected to vary from twenty-two persons in November to 585 persons in both August and September, averaging 192 persons per month. Assuming no mitigation measures, the area from Seeley Lake (Missoula County) through Ovando (Powell County) and Lincoln (Lewis and Clark County) is expected to lodge nonlocal population associated with pipeline section 5S (June and July in Seeley Lake) and 6S (April and May in all three communities) and pump station 3S (Seeley Lake). Population influx in this area will range from five persons in February to 252 persons in April, averaging seventy-one persons per month. Helena is likely to lodge nonlocals associated with section 7 (February through April) and section 6S (June through November) and pump stations 4S and 5S. Population influx will vary from thirty-nine persons in February to 627 persons in July, averaging 388 persons per month. Between April and September (with the exception of May) Helena would experience an impact of over 600 persons per month. Peak population in Missoula County is anticipated to be 600 persons in September including seventy-five spouses and thirty-seven school-age children. That month, Missoula would be affected by construction of section 5S, and Seeley Lake would be affected by construction of pump station 3S. Peak population in Ovando (Powell County) would be eighteen persons associated with construction of section 6S. Included in the impact would be two spouses and two school-age children. Peak population in Lewis and Clark County is expected to be 726 persons in April, in both Helena and Lincoln. Construction of section 7 and pump stations 4S and 5S would cause the impact in Helena, while construction of section 6 would cause the impact in Lincoln.

Granite County. Drummond would experience an influx of 349 persons in April and 371 persons in May, due to construction of section 6S. Peak population includes forty-seven spouses and thirty school-age children.

LODGING/HOUSING IMPACTS

Two types of lodging impacts can be expected: (1) an actual shortage[1] in lodging for nonlocal workers; and (2) a conflict for lodging between nonlocal

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[1]For most communities along NTPS alternative routes in Montana, lodging shortage is assumed to be "insignificant" if it is less than twenty-five units per night. For a shortage of between twenty-five and 100 units, the impact is "moderate" and for shortage in excess of 100 units per night, the impact is "severe." These definitions must be applied with care since a moderate impact in one community could be a severe impact in a smaller community.

workers and other transient populations, such as summer tourists and Canadian shoppers. The latter populations are an important market for retail trade and services in several larger Montana cities. Specifically, tourists are an important market for retailers in western Montana cities, while Canadian shoppers are an important market for retailers in Great Falls and cities along the Hi-Line. It is conceivable that a lodging shortage for tourists and Canadian shoppers may discourage purchases from Montana retailers. It is difficult to estimate if the pipeliners' own purchases would counterbalance this effect. Tables 31 through 35 present individual places within commuting distance to pipeline construction, by section and month, as well as the total supply of transient lodging units available to pipeline workers, the total demand for lodging units by pipeline workers, and the balance of units for each route alternative. Tables 36 through 40 present the supply and demand of lodging units for all NTP construction workers (including both pipeline and fixed-site workers) by geographic area, for each route alternative. (The heading "WEST" on these tables refers to construction areas between the Idaho border and the Missoula commuting range; the heading "EAST" refers to construction areas east of the commuting range of Circle, to the North Dakota line.)

NTPR

Tables 31 and 36 present lodging impacts that would be produced by construction of the NTPR, in the absence of any mitigation measures.

Sanders County. The construction of pipeline section 4 and 5 will produce two peak lodging impacts in the "WEST" area (Sanders County) if the proposed construction schedule is adhered to. First, the initial months of work on section 5 are forecast to produce increasing lodging demands on Sanders County's supply (primarily in Thompson Falls and Plains) during the period February through May 1980. In the first three months, this effect will be mitigated by the pipeliners' use of lodging in eastern Idaho; but by May, work will have progressed beyond commuting distance from several Idaho communities and a moderate shortage will result in Sanders County.

The second period of lodging impact is forecast to result from work on the eastern portion of section 4 during September through November 1980. An insignificant shortage of around eighteen units could occur in September. Some competition might arise between pipeliners and tourists in September, although tourists' demand for transient lodging typically falls off rather rapidly during the course of the month.

Missoula County. The lodging demands generated by pipeliners in the city of Missoula will span ten months (February through November 1980) and result from the construction of sections 5 and 6, as well as of pump stations at Paradise and Potomac. Lodging demands from section 6 construction can be anticipated during February through May, while those from section 5 construction will occur during June through November. Much lower demands will be present from pump station activity over the entire ten-month period.

Overall, Missoula has more than adequate capacity to accommodate pipeline-generated demands. However, a potential problem could occur during the summer months when Missoula's motels and RV parks usually have capacity rates of 90 to 100 percent due to tourism. Fortunately, lack of lodging may be mitigated by using university housing during the three summer months. Therefore, no significant adverse impacts are forecast for Missoula.

Powell County. No significant adverse lodging impacts are forecast to occur in Powell County, although some pipeliners might choose to locate in Deer Lodge during the June through September period.

Lewis and Clark County. Lodging demands from NTPS construction will be similar in magnitude and duration to those forecast for Missoula. Work on sections 6 and 7 together with that on pump stations near Helmville and Townsend will cause transient lodging demand. Ten months of impact, with minor demands in February, May, and November, will result, with the peak corresponding to the June through August tourist season.

Although no lodging shortfall is forecast for pipeliners staying in Helena, there will be strong competition with tourists for motel rooms and RV hookups during the summer. Past experience indicates that Helena can temporarily accommodate a large number of nonlocal visitors. The city's additional capacity in private homes and campus dormatories would have to be relied on to avoid impairment of the traditional tourist trade.

Broadwater, Meagher, Wheatland, Golden Valley, and Musselshell counties. Communities in this five-county area will experience significant transient lodging impacts from May through September and a moderate impact in October. The average lodging shortfall in these months will be 206 units, due to construction of section 7 and the fixed-site facilities at Harlowton. The greatest shortfall occurs in May, in the Townsend-White Sulphur Springs area, when work on pipeline section 7 has progressed eastward beyond commuting distance from Helena, but not yet within commuting range of Harlowton. The shortfall in lodging will be severe along the eastern two-thirds of section 7; all available transient lodging from White Sulphur Springs to Roundup will be occupied by pipeliners during those months when the job site is within commuting distance. The Townsend-White Sulphur Springs area will experience a shortfall of 355 units in May. Harlowton's greatest shortfall will be 340 units in July. Roundup's largest shortfall will be eighty-one units in September.

Fergus County. Although the NTPR does not pass through Fergus County, it is possible that some of the nonlocal labor on the pump station/delivery facility at Harlowton may stay in Lewistown, due to its larger size and more extensive facilities. However, if lodging can be found, most workers will stay in Harlowton, close to the site.

Petroleum, Garfield, McCone, Richland, and Roosevelt counties. Petroleum County has almost no lodging facilities where pipeliners might stay. For the remainder of the NTPR, all the way to the North Dakota border, significant transient lodging shortfalls can be anticipated. Because work will progress

quickly, nearly a mile per day in eastern Montana, the lodging problems will be relatively brief -- two to three months at any one location -- but they will be severe.[1]

Most workers will have no place to stay in Jordan and Circle because of a scarcity of motels and RV hookups. Farther east, the oil and gas development boom has most transient lodging facilities at full occupancy year-round. Williston, North Dakota, can offer no relief as it too is currently experiencing a shortage of lodging. Due to the construction of the western delivery facility and pump station northeast of Richey, moderate lodging shortages will occur even when the pipeline construction spread is not within commuting range. When the pipeline construction spread crew arrives in the area from July through October, demand for lodging will exceed supply by about 141, 224, 227, and 243 units respectively (see table 38).

DNRC Modified Route

Tables 32 and 37 summarize the lodging impacts due to construction on the DNRC Modified alternative. The impacts forecast for sections 4 and 7 will be identical to those of the NTPR.

Sanders County. Lodging impacts are identical to those of the NTPR.

Missoula County. Lodging impacts in Missoula are expected to be similar to those under the NTPR. The only exception is in June, when nonlocal workers on section 6D can still commute to the construction site from Missoula. As a result, twenty-eight percent of the city's motel units and RV/trailer/camper hookups could be used by pipeline workers, creating a conflict with tourists during the summer season. Except in June, the impact on Missoula will be less than under the NTPR because Deer Lodge is within commuting distance to section 6D.

Granite County. No impacts are expected. Though pipeline workers in section 6D are able to commute from Drummond from February through September, lodging is available in each of those months in larger cities -- Missoula, Deer Lodge, and Helena.

Powell County. For the life of the project, pipeline workers on section 6D can commute from Deer Lodge to the construction site. As construction moves out of convenient commuting distance to Missoula, and before it reaches convenient commuting distance to Helena, a proportion of nonlocals can be expected to locate in Deer Lodge. Overall, Deer Lodge will comfortably hold workers from April through September. At the peak -- July and August -- over one-third of the city's known lodging units will be occupied by pipeline workers and their families, which may produce conflict with summer tourists.

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[1]Pump station and delivery facility construction is an exception in which nonlocal workers may be present in a community for ten to fourteen months. Note that the same workers will not stay there over that period of time; rather, the workers will change at different stages in the job where different skills are required.

Lewis and Clark County. The effect on Helena follows the same pattern as under the NTPR, but is less because of the proximity of section 6D to Deer Lodge.

Jefferson, Broadwater, Meagher, Wheatland, Golden Valley, Musselshell, Petroleum, and Garfield counties. Impacts identical to those of the NTPR are expected.

McCone County. Circle is within commuting distance to section 8D from May through November and is within commuting distance to pump station 7N and the western delivery facility for the duration of those projects. Consequently, a larger impact is forecast for McCone County than under the NTPR. A significant shortfall averaging 262 transient lodging units will occur between May and September, and an insignificant shortfall will occur again in November.

Richland and Roosevelt counties. Because workers can commute from Circle, demands on housing in the oil and gas boom area in northeastern Montana should be less than under the NTPR. A significant lodging shortfall is forecast to occur in October; moderate shortfalls are forecast for July, August, and September. Slight shortages will occur in May, June, and November. If construction workers are willing to commute sixty miles one way, they probably could stay in Glendive.[1]

Hi-Line Route. Tables 33 and 38 summarize the lodging impacts that would result from construction of the Hi-Line Route. The impacts forecast for section 4 and 5 will be identical to those of the NTPR. Those lodging impacts on Missoula and Helena associated with the construction of pipeline section 6H will also be similar to NTPR impacts.

Lewis and Clark County. In Helena, pipeliners will put the greatest demand on lodging at the peak of the tourist season. For example, in July 1980, thirty-one percent of Helena's motel units and RV/trailer hookups will be occupied by pipeline workers. Overall, Helena will lodge pipeliners from February to November. The transient lodging demands will be for less than twenty-five units through May and again in November, about 460 during June through August and 235 and 167 units for September and October, respectively.

Cascade County. Great Falls will house pipeline workers from section 6H and 7H, as well as from the Glacier delivery facility and pump station. No shortage of lodging is expected in Great Falls and no major conflicts with Canadian visitors or summer tourists are forecast. Lodging demands from the pipeline will be felt over a fourteen-month period, with peak demand representing only nineteen percent of Great Falls' motel units and RV/trailer hookups.

Chouteau County. No lodging impacts are expected because workers probably will commute from Great Falls and Havre.

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[1]However, the local college in Glendive is turning students away because of a lack of rental housing.

Hill County. Peak demands on Havre's transient lodging will occur during the July through September period, when 300 - 400 units will be required -- up to thirty-eight percent of the city's motel units and RV/trailer hookups. This demand could conflict with two important markets for Havre: Canadian shoppers and summer tourists.

Blaine and Phillips counties. Significant lodging impact is forecast for the Harlem-Malta-Saco zone of Blaine and Phillips counties during the initial months' work on section 8. Specifically, significant shortfalls are forecast for April, May, and June of 1980.

Valley County. Glasgow could conceivably serve as the lodging site for workers on section 8H during a four to six week period from June to July. However, the commuting distance is so great that the practicality of workers lodging in Glasgow must be questioned. It would be more realistic to suppose that pump station 7H would be constructed by workers commuting from Malta to the site.

Daniels and Sheridan counties. The Scobey-Plentywood segment of section 8H will have significant lodging shortfalls because of Northern Tier requirements during the July through October period. In addition, some conflict in lodging demands with Canadian shoppers can be expected during most of the construction period, particularly near Plentywood where the western delivery facility and pump station will be constructed.

Raynesford Route

Tables 34 and 39 show the forecast lodging impacts for the Raynesford Route. Overall, the impacts for sections 4 and 5 will be identical to those discussed under the NTPR, while those of section 6H will be the same as those identified under the DNRC Modified Route. The major differences occur as a result of section 7L, which affects Great Falls and the Denton-Winnett strip.

Cascade County. The demand for transient lodging in Great Falls will have two peak periods: March to May from section 7L workers and in September through October from section 6H workers. No significant adverse impacts are forecast, though some competition with Candidan tourists may occur.

Judith Basin County. No impact is forecast due to proximity to Great Falls.

Fergus and Petroleum counties. The area including Denton, Lewistown, and Winnett, along section 7L, will have significant lodging shortages from June through August, and a moderate shortage in September. The average monthly shortfall will be about 127 units. In addition, some competition with summer tourists for rooms in Lewistown may occur. Lodging capacities in this area are adequate to accommodate NTPS demand.

Knox Pass Route

Tables 35 and 40 show lodging impacts on the Knox Pass Route. With the exception of pump station 1K, located at Thompson Falls, section 4 is identical to the NTPR.

Sanders and Mineral counties. The impact due to section 4K is almost identical to that of the NTPR, with a shortfall occurring in September (in eastern Idaho and Sanders County). However, because of nonlocals associated with pump station 1K, that shortfall is moderate -- twenty-nine units -- rather than insignificant (eighteen units on the NTPR). The impact from section 5K is less than on the NTPR because more communities (in Mineral County) are within commuting distance of the pipeline route.

Missoula County. For most of the project's construction, the impact on Missoula is less than under the NTPR because of the proximity of additional communities in Mineral County. In May it is possible for nonlocals to commute from Missoula to both sections 5K and 6K. Consequently, nonlocal workers will occupy fifty percent of Missoula's 1800 motel units and RV/trailer/camper hookups. A serious conflict may exist, therefore, at the beginning of the tourist season.

Arlee Route

Section 5A differs significantly from the corresponding section on the NTPR. Tables 35 and 40 present summaries of lodging impacts on the Arlee alternative.

Sanders and Lake counties. It is more likely that nonlocals will commute from Plains than from Missoula to pump station 1S. Therefore, like the Knox Pass Route, a shortfall of twenty-nine units will occur in September in eastern Idaho and Sanders County. Other impacts will be less than on the NTPR, for two reasons: first, more communities (in Lake County) are within commuting distance to section 5A; and second, Missoula is within commuting distance in May (rather than in June, as in the NTPR). Maximum demand for lodging, therefore, will occur in March to April and September to October, avoiding conflict with tourist demand.

Missoula County. In effect, the impact on Missoula is identical to that of the Knox Pass Route. An overlap in commuting to section 5A and 6A will occur in May. Consequently, fifty-one percent of available transient lodging units in Missoula is expected to be occupied by nonlocal workers and their families, creating a serious conflict.

St. Ignatius Route

Sections 5S and 6S differ significantly from those of the NTPR. Tables 35 and 40 present lodging impacts for the St. Ignatius Route.

Sanders and Lake counties. It is likely that nonlocals will commute from Plains (Sanders County) to pump station 1S and from Polson (Lake County) to pump station 2S. In addition, Missoula is out of the sixty-mile range for commuting to section 5S until August. Because of these three differences from the NTPR, shortfalls are expected during May, June, and July in Sanders and Lake counties and during September in eastern Idaho as well as in Montana. In May, an insignificant shortfall will take place; in June and July, a significant shortfall (182 and 246 units, respectively) will occur; and in September, a moderate shortfall (forty units) will occur.

Missoula. Under the St. Ignatius Route, Missoula is out of commuting range to section 6S after March and to section 5S before August. Therefore, the forecast lodging impact is much lower than under any other route. The greatest conflict with tourists will occur in August, when nonlocal workers are anticipated to occupy twenty-five percent of the city's lodgings.

Seeley Lake, Powell County, and Lincoln. It is likely that nonlocals constructing pump station 3S will locate in Seeley Lake (Missoula County). The city of Missoula is beyond commuting range to section 6S after March. Helena is beyond commuting range to section 6S until June. Consequently, a significant lodging shortfall (124 and 115 units) will take place in April and May in the area including Seeley Lake, Ovando (Powell County), and Lincoln (Lewis and Clark County).

Granite County. During April and May, Drummond is within commuting distance to section 6S. Because neither Missoula nor Helena are within range during those months, Drummond is forecast to experience a lodging shortfall of 182 and 202 units, respectively.

City of Helena. Under the NTPR, Helena can be expected to lodge nonlocals associated with sections 6S and 7S, and pump stations 4S and 5S. The magnitude and distribution of lodging demand in Helena under the St. Ignatius Route is almost identical to that under the NTPR.

ECONOMIC IMPACTS

The primary short-term economic impact will be an increase in income. Local income will be directly increased by two major sources -- construction payroll and local purchases of goods and services required for construction. Payroll expenses will increase Montana income directly and indirectly by the income induced from expenditures by construction workers. It is assumed that the workers' purchases will occur in the county where they stay.

The lodging impact section is used to identify where and how long each work force will stay along the routes. The timing is then matched to the manpower requirements given in tables 16, 17, and 18 to derive the number of man-months that the workers will reside in the various cities and towns throughout the state. Man-months are converted into gross payroll by using the average gross payroll per man-month for the NTPR -- $4,695. The results of these calculations are presented in table 55.

TABLE 55. Estimated Payroll by County of Worker Residence.

	NTPR		DNRC Modified		Hi-Line		Raynesford		Knox Pass		Arlee		St. Ignatius	
COUNTY	Man-Months	Gross Payroll ($000)	Man-Months	Gross Payroll ($000)	Man-Months	Gross Payroll ($000)	Man-Months	Gross Payroll ($000)	Man-Months	Gross Payroll ($000)	Man-Months	Gross Payroll ($000)	Man-Months	Gross Payroll ($000)
Sanders, Lake and Mineral	718	3,371	718	3,371	718	3,371	718	3,371	799	3,752	477	2,240	1,259	5,912
Missoula	3,857	18,110	4,106	19,280	3,857	18,110	3,857	18,110	4,320	20,285	4,320	20,285	1,768	8,30[illegible]
Powell and Granite			328	1,540										
Lewis & Clark	3,394	15,936	2,817	13,226	2,025	9,508	2,262	10,621	3,394	15,936	3,394	15,936	3,392	15,927
Cascade					2,561	12,025	2,273	10,673						
Hill					2,189	10,278								
Construction Camp Regions	7,490	35,169	7,490	35,169	3,761	17,660	6,001	28,177	7,490	35,169	7,490	35,169	9,342	43,865
TOTAL	15,459	72,586	15,459	72,586	15,111	70,952	15,111	70,952	16,003	75,142	15,681	73,630	15,761	74,006

The induced income of construction worker expenditures is then calculated by netting out social security contributions from gross payroll and multiplying by the induced income multipliers of table 41. The total income effect of the payroll is the sum of the induced income and gross payroll and is shown with the induced income in table 56. The largest income impact -- over $33 million -- will be received by Missoula County. This is because of Missoula's convenient access to both construction section 5 and 6 and the slower rates of construction of these sections. Total state income impacts will not differ significantly by route.

Income will also result from the local purchases of materials and services by the construction contractors. These purchases are said by construction contractors to be between forty to forty-five percent of gross payroll (Green Construction Company 1978; Reading and Bates Construction Company 1978). The conservative forty percent figure is employed for the purpose of this analysis. Not all of these purchases will represent income to Montana; some of the goods or raw materials must come from out-of-state. But, the bulk of these purchases are for goods and services produced within the state (for example, petroleum products, lumber, concrete, and mechanical services). Thus, a conservative two-thirds is assumed to represent the proportion of value added in Montana for these purchases. Value added in Montana will be equal to the amount of income realized in Montana. Table 58 reports the income effects of contractors' purchases and total income effect of the Northern Tier Pipeline project which will be taxable by Montana. Although substantial, the increase in economic activity will be short lived.

Not all of the direct and indirect income reported in table 57 can be considered Montana's, since much of the original gross payroll will be received by nonresident workers. As discussed above, nonlocals will receive an estimated ninety-two percent of gross payroll, and nonlocals spend only fifty-seven percent of what local workers spend locally (Mountain West Research, Inc. 1979). All of the induced income, from both contractors' purchases and gross payroll, will be received by Montana workers. However, a proportion of gross payroll accruing to out-of-state workers must be subtracted from total income effects. Therefore, 39.6 percent of gross payroll (ninety-two percent of forty-three percent) can be expected to be spent outside of Montana, and must be subtracted from the total income effects presented in table 57. The total income accruing to Montana from the several routes is shown in table 58.

TABLE 56. Estimated Induced Income Effect of Construction Worker Expenditures ($000)

County	NTPR		DNRC Modified		Hi-Line		Raynesford		Knox Pass		Arlee		St. Ignatius	
	Induced Income	Total[1]	Induced Income	Total[1]	Induced Income	Total[1]	Induced Income	Total[1]	Induced Income	Total[1]	Induced Income	Total[1]	Induced Income	Total[1]
Sanders, Lane and Mineral	443	3,814	443	3,814	443	3,814	443	3,814	493	4,245	294	2,534	776	6,688
Missoula	12,058	30,168	12,739	32,019	12,058	30,168	12,058	30,168	13,496	33,781	13,496	33,781	7,496	15,798
Powell and Granite			202	1,742										
Lewis & Clark	9,275	25,211	9,706	22,933	5,534	15,042	6,181	16,802	9,275	25,211	9,275	25,211	9,275	25,196
Cascade					9,121	21,146	6,211	16,884						
Hill					3,859	14,137								
Construction Camp Counties	16,837	52,006	16,837	52,006	10,090	27,750	13,490	41,667	16,837	52,006	16,837	52,006	21,000	64,865
TOTAL	38,613	111,199	39,927	112,514	41,105	112,057	38,383	109,335	40,101	115,243	39,902	113,532	38,541	112,547

[1]Induced income plus gross payroll.

TABLE 57. Estimated Income Effects ($000)

Income	NTPR	DNRC Modified	Hi-Line	Raynesford	Knox Pass	Arlee	St. Ignatius
Gross Payroll	72,586	72,586	70,952	70,952	75,142	73,630	74,006
Induced Income	38,613	39,927	41,105	38,383	40,101	39,902	38,541
Subtotal	111,199	112,514	112,057	109,335	115,243	113,532	112,547
Income from Contractor Purchases:							
Contractor Purchases	29,034	29,034	28,361	28,361	30,057	29,452	29,602
Value Added (67%)	19,453	19,453	19,002	19,002	20,138	19,733	19,833
Induced Income[1]	19,842	19,842	19,382	19,382	20,541	20,128	20,230
Subtotal	39,295	39,295	38,384	38,384	40,679	39,861	40,063
GROSS INCOME EFFECT	150,494	151,809	150,441	147,719	155,922	153,393	152,610
Less 39.6% of Gross Payroll Spent Out of State							
Net Income Effect	121,779	123,093	122,372	119,650	126,196	124,265	123,333

[1]Induced income plus gross payroll.

TABLE 58. Net Income Effects

Route	Income
NTPR	$121,779,000
DNRC Modified	123,093,000
Hi-Line	122,372,000
Raynesford	119,650,000
Knox Pass	126,196,000
Arlee	124,265,000
St. Ignatius	123,333,000

The only employment effects which can be confidently predicted are those which result directly from the construction of the pipeline. The basis for estimating these effects is table 26 and 27, together with tables 16 to 18. On the average, about 22.5 percent of the jobs on the pipeline construction spreads will go to Montana residents and about fifty percent of those on the fixed-site facilities. The number of positions is best represented by person-year equivalents; that is, the number of person-months required to construct the project divided by twelve. This number will actually understate the number of Montanans employed on the project, since the average length of employment is eight to nine months. Construction phase employment of Montana residents is summarized in table 59.

TABLE 59. Montana Residents Employed in Pipeline Construction (person-year equivalents)

	NTPR, DNRC, Knox Pass, Arlee, and St. Ignatius	Hi-Line	Raynesford
Pipeline Sections	265	258	255
Pipeline Stations	117	117	117
TOTAL	381	375	372

In addition to this direct employment, the possibility exists for induced or secondary employment to result from induced income effects during construction. In reality, it is expected that only a small portion of this potential secondary employment will occur, due to the extremely transitory nature of the project. Experience from other pipeline projects suggests that more jobs do not result -- present employees work harder and longer.

FISCAL IMPACTS

Property Taxes

Property taxes will be the largest fiscal impact of the Northern Tier Pipeline project. The massive investment of approximately $400 million will significantly increase the tax base throughout the state. Tables 61 through 65 show the estimated property tax liabilities facing NTPC for 1981 for each county and each route, assuming local property tax rates at current levels. The total state tax liability varies from $10.5 million to $11.9 among the different routes. The most important implication of these numbers is their relative impact on local budgets, shown in the last columns of tables 61 to 65. Petroleum County may receive additional revenues equal to over ninety percent of its current government expenditures with mill levies held at present rates, if the Raynesford Route is chosen. This represents a major increase in the choices available to the residents of Petroleum County in improving their public services or in relieving their local tax burdens, as the pipeline would provide over forty-seven percent of revenues in the county. Other counties stand to gain a significant windfall from NTPC, although none will gain relatively as much as Petroleum County.

The differences in the tax liabilities by route result from two components -- total investment and differences in average mill rates. The average mill rate per mile explains most of the differences in total tax liability by route. Both the Hi-Line and Raynesford routes average higher mill levies than the NTPR which lessens the impact of the higher investment exhibited by the NTPR.

Local discretion will determine the use of these potential revenues. There are two basic options available to the affected communities -- reduce taxes or increase services and expenditures. If it is decided to increase local services, then expenditures on these services may be increased up to the percentage listed in tables 60 to 64. Alternatively, if tax reductions are chosen, the actual tax relief will be less than the percentage shown in these tables. This is because if local mill rates are lowered, NTPC will also pay less taxes. For example, suppose that NTPC's projected taxes are fifty percent of the total tax revenue of some county. To generate the same revenue as before the pipeline, tax rates would have to be reduced by thirty-three percent.

Regardless of the decisions of the counties along the route, the expanded tax base which results from the proposed pipeline project represents a significant potential for Montana communities to improve their local public services and reduce their tax burdens.

A tangential issue of the possible tax impacts of re-routing the pipeline through Missoula or of annexing part of the pipeline route to Helena has arisen. At the current level of these city levies, each mile the pipeline is within city limits would add revenues of $6,940 per year to the city of Missoula and $6,020 to the city of Helena; this alone would not seem to justify any major revision in the route.

TABLE 60. Estimates of County Property Tax Liability 1981 NTPR.

(1978 dollars)

County	Pipeline Length (kms)	County Weighting Factor %	Taxable[1] Value ($000)	Average Rural Mill Rate	Property Tax Liability Total $	Property Tax Liability As a Percentage[2] of 1978 Revenue	Property Tax Liability As a Percentage[2] of 1978 Expenditures
Sanders	101.3	10.3	6,592	155.10	1,022,419	10.9	12.4
Missoula	113.2	11.5	7,360	215.04	1,582,694	2.2	2.5
Granite	22.9	2.3	1,472	170.24	250,593	8.3	18.5
Powell	72.3	7.3	4,672	168.27	786,157	10.0	15.0
Lewis and Clark	50.6	5.1	3,264	221.34	722,454	2.0[3]	1.9
Jefferson	2.4	0.2	128	228.34	29,228	0.6[3]	0.6
Broadwater	70.4	7.1	4,540	164.07	744,878	26.7	29.9
Meagher	68.2	6.9	4,416	163.86	723,606	37.7	39.9
Wheatland	67.8	6.8	4,352	183.86	800,159	38.3	38.4
Golden Valley	29.9	2.9	1,356	154.15	286,102	27.1	28.6
Musselshell	26.9	2.6	1,664	132.73	220,862	6.1	6.2
Fergus	4.1	0.4	256	163.85	41,946	0.4[4]	0.4[4]
Petroleum	57.8	5.6	3,584	129.61	449,517	81.2[4]	86.6[4]
Garfield	134.2	13.0	8,320	154.80	1,287,936	61.1[4]	64.8[4]
McCone	88.9	8.6	5,504	168.61	928,029	17.5[4]	20.1[4]
Dawson	2.4	0.2	128	186.68	23,895	0.2	0.2
Richland	88.6	8.6	5,504	147.72	813,051	8.3	8.9
Roosevelt	5.1	0.5	320	182.60	58,432	0.5	0.5
TOTAL	1,007.0	100.0	64,000	NA	10,821,958	NA	NA

[1]16% of Montana total costs times the county-weighting factors.

[2]Total tax liability divided by total county revenues or expenditures.

[3]1977 data for revenues and expenditures.

[4]1976 data for revenues and expenditures.

SOURCE: Montana Department of Community Affairs 1979.

TABLE 61. Estimates of County Property Tax Liability 1981

DNRC Modified Route.

(1978 dollars)

County	Pipeline Length (kms)	County Weighting Factor %	Taxable[1] Value ($000)	Average Rural Mill Rate	Property Tax Liability Total $	As a Percentage of 1978 Revenue	As a Percentage of 1978 Expenditures
Sanders	101.7	10.2	6,601	155.10	1,023,815	10.9	12.4
Missoula	118.2	11.9	7,702	215.04	1,656,238	2.3	2.7
Granite	43.9	4.4	2,848	170.24	484,844	16.1	35.8
Powell	55.8	5.6	3,624	168.27	609,810	7.8	11.7
Lewis and Clark	49.9	5.0	3,236	221.34	716,256	2.0[3]	1.9[3]
Jefferson	2.4	0.2	129	228.34	29,456	0.6[3]	0.6[3]
Broadwater	70.4	7.1	4,595	164.07	753,902	27.1	30.3
Meagher	68.2	6.9	4,466	163.86	731,799	38.1	40.3
Wheatland	67.6	6.7	4,336	183.86	797,217	38.1	38.2
Golden Valley	29.9	2.9	1,877	154.15	289,340	27.4	28.9
Musselshell	26.9	2.6	1,683	132.73	223,385	6.1	6.3
Fergus	4.1	0.4	259	163.85	42,437	0.4[4]	0.4[4]
Petroleum	57.6	5.5	3,560	129.61	461,412	75.0[4]	80.0[4]
Garfield	138.1	13.2	8,543	154.80	1,322,456	62.7[4]	66.6[4]
McCone	62.0	5.9	3,818	168.61	643,753	12.2[4]	13.9[4]
Dawson	39.2	3.8	2,459	186.68	459,046	4.0	4.2
Richland	75.9	7.3	4,725	147.72	697,977	7.1	7.6
Roosevelt	5.1	0.5	324	182.60	59,162	0.5	0.5
TOTAL	1,017.1	100.0	64,720	NA	11,002,304	NA	NA

[1]16% of Montana total costs times the county weighting factors.

[2]Total tax liability divided by total county revenues or expenditures.

[3]1977 data for revenues and expenditures.

[4] data for revenues and expenditures.

SOURCE: Montana Department of Community Affairs, 1979.

TABLE 62. Estimates of County Property Tax Liability 1981

Hi-Line Route.

(1978 dollars)

County	Pipeline Lenght (kms)	County Weighting Factor %	Taxable[1] Value ($000)	Average Rural Mill Rate	Property Tax Liability Total $	As a Percentage[2] of 1978 Revenue	1978 Expenditures
Sanders	101.7	10.5	6,672	155.10	1,034,827	11.1	12.5
Missoula	130.2	13.4	8,515	215.04	1,831,066	2.5	2.9
Powell	38.1	3.9	2,478	168.27	416,973	5.2	8.0
Lewis and Clark	72.9	7.5	4,766	221.34	1,054,906	2.9	2.8
Cascade	87.3	8.9	5,656	247.28	1,398,616	2.2	2.2
Chouteau	108.1	10.6	6,736	162.12	1,092,040	15.1	16.0
Hill	53.6	5.3	3,368	195.59	658,747	4.2	4.3
Blaine	88.3	8.7	5,529	162.72	899,679	10.5	12.4
Phillips	83.3	8.2	5,211	174.50	909,320	16.0	16.7
Valley	88.6	8.7	5,529	172.73	955,024	8.4	9.0
Daniels	75.9	7.5	4,766	179.46	855,306	2.7	2.8
Sheridan	68.3	6.7	4,258	191.99	817,493	15.4	16.1
TOTAL	996.0	100.0	63,547	NA	11,923,998	NA	NA

[1]16% of Montana total costs times the county weighting factors.

[2]Total tax liability divided by total county revenues or expenditures.

SOURCE: Montana Department of Community Affairs, 1979.

TABLE 63. Estimates of County Property Tax Liability 1981--Raynesford Route.

(1978 dollars)

County	Pipeline Length (kms)	County Weighting Factor %	Taxable[1] Value ($000)	Average Rural Mill Rate	Property Tax Liability Total $	As a Percentage[2] of 1978 Revenue	1978 Expenditures
Sanders	101.7	10.4	6,448	155.10	1,000,085	10.7	12.1
Missoula	130.2	13.4	8,308	215.04	1,786,552	2.5	2.9
Powell	38.1	3.9	2,418	168.27	406,877	5.2	7.8
Lewis and Clark	72.9	7.5	4,650	221.34	1,029,231	2.8	2.7
Cascade	102.1	10.5	6,510	247.28	1,609,793	2.6	2.6
Judith Basin	50.5	5.0	3,100	168.30	521,730	16.9	18.5
Fergus	113.6	11.2	6,944	163.85	1,137,774	10.4[3]	11.1[3]
Petroleum	67.2	6.6	4,092	129.61	530,364	86.3[3]	92.0[3]
Garfield	138.1	13.6	8,432	154.80	1,305,274	61.9[3]	65.7[3]
McCone	62.0	6.1	3,782	168.61	637,683	12.1[3]	13.8[3]
Dawson	39.2	3.9	2,418	186.68	451,392	3.9	4.2
Richland	79.9	7.5	4,650	147.72	686,898	7.0	7.5
Roosevelt	5.1	0.5	310	182.60	56,606	0.5	0.5
TOTAL	996.6	100.0	62,000	NA	11,103,653	NA	NA

[1]16% of Montana total costs times the county weighting factors.

[2]Total tax liability divided by total county revenues or expenditures.

[3]1977 data for revenues and expenditures.

SOURCE: Montana Department of Community Affairs 1979.

TABLE 64. Estimates of County Property Tax Liability 1981

Arlee, Knox Pass, and St. Ignatius Routes.

(1978 dollars)

County	Pipeline Length (kms)	County Weighting Factors %	Taxable[1] Value ($000)	Average Rural Mill Rate	Property Tax Liability Total $	As a Percentage[2] of 1978 Revenue	As a Percentage[2] of 1978 Expenditures
ARLEE							
Sanders	137.6	61.4	11,469	155.10	1,778,842	19.0	21.5
Lake	14.4	6.4	1,195	182.95	218,625	1.5	1.5
Missoula	72.0	32.2	6,014	215.04	1,293,251	1.8	2.1
TOTAL	224.0	100.0	18,679	NA	3,290,718	NA	NA
KNOX PASS							
Sanders	42.4	18.2	3,418	155.10	530,132	5.7	6.4
Mineral	99.0	42.5	7,981	270.96	2,162,532	60.9	64.7
Missoula	91.3	39.3	7,380	215.04	1,586,995	2.2	2.5
TOTAL	232.7	100.0	18,778	NA	4,279,659	NA	NA
ST. IGNATIUS							
Sanders	115.0	11.9	7,516	155.10	1,165,732	12.5	14.1
Lake	48.0	4.9	3,095	182.95	566,230	3.9	4.0
Missoula	44.8	4.6	2,905	215.04	624,691	0.9	1.0
Powell[3]	88.0	9.1	5,747	168.27	967,048	12.4	18.5
Others[3]	697.3	69.5	43,895	NA	7,180,095	NA	NA
TOTAL	933.3	100.0	63,159	NA	10,503,796	NA	NA

[1]16% of Montana total costs times the county weighting factors.

[2]Total tax liability divided by total county revenues or expenditures.

[3]Counties on NTPR from Lewis and Clark eastward.

SOURCE: Montana Department of Community Affairs 1979.

Personal Income Taxes

Montana income taxes will be paid on the total gross construction payroll earned in Montana and on all the induced income in Montana resulting from construction of the pipeline. The total income shown in table 57 (adjusted to include gross payroll earned by workers on that part of section 4 constructed in Montana who are likely to reside in eastern Idaho) is multiplied by Montana's average tax rate -- 3.5 percent -- to obtain the estimated income tax attributable to the Northern Tier Pipeline Project.

TABLE 65. Probable Income Taxes on Earned and Induced Income by Route.

Route	Income Taxes
NTPR	$5,477,000
DNRC Modified	5,523,000
Hi-Line	5,475,000
Raynesford	5,380,000
Knox Pass	5,578,000
Arlee	5,542,000
St. Ignatius	5,501,000

IMPACTS ON PUBLIC AND COMMERCIAL SERVICES AND FACILITIES

Because of the short-term duration of population influx, impacts on most public services and facilities are forecast to be minimal and surveys support this conclusion. The impact most likely to occur will be upon schools, health care systems, and public facilities.

Impacts on Public Schools

Tables 49 through 53 show the peak number of school-age children which is expected to accompany the nonlocal work force in each county. Tables 66 through 70 present the education impact attributed to the peak population influx in each county for each route.

For all routes, the impact upon public schools is insignificant under the criteria that available excess capacity exceeds incremental demand. Most of the peak population influx comes during the summer when schools are closed. In no case is the baseline county student/staff ratio less than that of the state, rising to a level greater than that of the state under the impact projection.[1] In all but four cases, the percentage change of the student/staff ratio is less than five percent. Three of the exceptions are in counties along the NTPR: in

[1]Mountain West Research, Inc. 1979.

TABLE 66. Education Impact--NTPR.

	Baseline[1]			Impact			
	Students	Student/ Staff Ratio	Ratio as % of State Avg.	Students	Student/ Staff Ratio	Ratio as % of State Avg.	% Change Student/ Staff Ratio
Sanders	1,977	15.16	93.3	2,000	15.33	94.4	1.17
Missoula	13,972	16.60	102.2	14,024	16.67	102.6	0.39
Powell	1,594	17.14	105.5	1,594	17.14	105.5	
Lewis & Clark	9,190	17.76	109.4	9,242	17.86	110.0	0.57
Jefferson	1,672	19.28	118.7	1,672	19.28	118.7	
Broadwater	645	16.97	104.5	657	17.29	106.5	1.88
Meagher	463	14.45	89.0	498	15.56	95.8	7.70
Wheatland	520	13.40	82.5	570	14.69	90.5	9.62
Golden Valley	202	9.18	56.5	202	9.18	56.5	
Musselshell	1,013	15.68	96.6	1,030	15.94	98.2	1.69
Fergus	2,744	14.06	86.6	2,750	14.10	86.8	0.25
Petroleum	152	11.78	72.6	152	11.78	72.6	
Garfield	397	9.57	58.9	443	10.67	65.7	11.15
McCone	648	14.79	91.1	669	15.27	94.1	3.24
Richland	2,426	14.71	90.6	2,438	14.78	91.0	0.51
Roosevelt	2,788	12.96	79.8	2,792	13.02	80.2	0.48
Montana	170,343	16.24	NA	170,343	16.24	NA	NA

[1]1976-77 school year.

TABLE 67. Education Impact--DNRC Modified Route.

	Baseline[1]			Impact			% Change
	Students	Student/ Staff Ratio	Ratio as% State Avg.	Students	Student/ Staff Ratio	Ratio as% State Avg.	Student/ Staff Ratio
Sanders	)		See table 66.				
Missoula	13,972	16.60	102.2	14,010	16.65	102.5	0.31
Granite	621	17.45	107.4	621	17.45	107.4	
Powell	1,594	17.14	105.5	1,603	17.23	106.1	0.60
Lewis & Clark	9,190	17.76	109.4	9,240	17.86	110.0	0.52
Jefferson	)						
Broadwater	)						
Meagher	)						
Wheatland	)		See table 66.				
Golden Valley	)						
Musselshell	)						
Fergus	)						
Petroleum	)						
Garfield	)						
McCone	648	14.97	91.1	685	15.64	96.3	4.48
Richland	2,426	14.71	90.6	2,453	14.88	91.6	1.10
Roosevelt	2,788	12.96	79.8	2,793	13.03	80.2	0.52
MONTANA	170,343	16.24	NA	170,343	16.24	NA	NA

[1]1976-77 school year.

TABLE 68. Education Impact--Hi-Line Route.

	Baseline[1]			Impact			% Change
	Students	Student/ Staff Ratio	Ratio as % State Avg.	Students	Student/ Staff Ratio	Ratio as % State Avg.	Student/ Staff Ratio
Sanders	1,977	15.16	93.3	2,000	15.33	94.4	1.17
Missoula	13,972	16.60	102.2	14,024	16.67	102.6	0.39
Powell	1,594	17.14	105.5	1,594	17.14	105.5	
Lewis & Clark	9,190	17.76	109.4	9,238	17.85	109.9	0.53
Cascade	18,950	18.22	112.2	18,997	18.27	112.5	0.27
Chouteau	1,334	12.20	75.1	1,334	12.20	75.1	
Hill	4,062	14.29	88.0	4,103	14.44	88.8	1.02
Blaine	1,847	11.68	71.9	1,869	11.83	72.8	1.31
Phillips	1,248	15.16	93.3	1,293	15.71	96.7	3.63
Daniels	705	11.87	73.1	749	12.61	77.6	6.23
Sheridan	1,257	12.79	78.8	1,285	13.07	80.5	2.19
Montana	170,343	16.24	NA	170,343	16.24	NA	NA

[1]1976-77 school year.

TABLE 69. Education Impact--Raynesford Route.

	Baseline[1]			Impact			% Change
	Students	Student/ Staff Ratio	Ratio as % State Avg.	Students	Student/ Staff Ratio	Ratio as % State Avg.	Student/ Staff Ratio
Sanders	)						
Missoula	)	See table 68.					
Powell	)						
Lewis & Clark	)						
Cascade	18,950	18.22	112.2	18,974	18.24	112.3	0.13
Judith Basin	576	12.23	75.3	576	12.23	75.3	
Fergus	2,744	14.06	86.6	2,787	14.28	88.0	1.56
Petroleum	152	11.78	72.6	155	12.02	74.0	2.00
Garfield	)	See table 66.					
McCone	648	14.97	91.1	685	15.64	96.3	4.48
Richland	2,426	14.71	90.6	2,453	14.88	91.6	1.10
Roosevelt	2,788	12.96	79.8	2,793	13.03	80.2	0.52
Montana	170,343	16.24	NA	170,343	16.24	NA	NA

[1]1976-77 school year.

TABLE 70. Education Impact--Knox Pass, Arlee, and St. Ignatius Routes.

	Baseline[1]			Impact			% Change
	Students	Student/ Staff Ratio	Ratio as % State Avg.	Students	Student/ Staff Ratio	Ratio as % State Avg.	Student/ Staff Ratio
KNOX PASS							
Sanders	1,977	15.16	93.3	1,990	15.26	94.0	0.72
Mineral	949	13.35	82.2	967	13.60	83.7	1.82
Missoula	13,972	16.60	102.2	14,065	16.71	102.9	0.70
ARLEE							
Sanders	1,977	15.16	93.3	1,991	15.26	94.0	0.76
Lake	4,149	16.46	101.3	4,158	16.49	101.6	0.25
Missoula	13,972	16.60	102.2	14,067	16.72	102.9	0.72
ST. IGNATIUS							
Sanders	1,977	15.16	93.3	2,003	15.36	94.6	1.38
Lake	4,149	16.46	101.3	4,176	16.56	102.0	0.66
Missoula	13,972	16.60	102.2	14,019	16.66	102.6	0.38
Powell	1,594	17.14	105.5	1,596	17.16	105.7	0.16
Granite	621	17.45	107.4	651	18.29	112.6	4.84
Lewis & Clark	9,190	17.76	109.4	9,247	17.87	110.0	0.59

[1]1976-77 school year.

Meagher County, the student/staff ratio rises 7.7 percent; in Wheatland County, the ratio rises 9.6 percent; and in Garfield County, the ratio rises 11.2 percent. Along the Hi-Line Route, the ratio rises 6.2 percent in Daniels County. (Under the St. Ignatius Route, the student/staff ratio in Granite County rises 4.8 percent.) Since the influx will be felt unevenly in schools throughout the county, it is likely that the capacity of particular schools may be strained. This is more likely, of course, in smaller counties and schools than in larger ones, and suggests that at least Daniels, Granite, Garfield, Wheatland, and Meagher counties may be so affected.[1] Both interviews with appropriate officers and research into available planning documents for all counties in each route reveal that in only two larger counties -- Lewis and Clark and Hill counties -- does the possibility exist that individual schools already at capacity might be strained beyond capacity by incremental demand.

Impacts on Health Care Systems

Research on health care facilities in all counties along the alternative routes indicate that impacts on these facilities by pipeline workers and their families would be insignificant.

Impacts on Other Public Services and Facilities

Interviews with appropriate officials and research of available planning documents reveal that the sole impact in other public services generated by statewide corridors may occur in Havre where fire protection services are understaffed. Otherwise, no capacity problems have been identified regarding water supplies, sewage treatment, mental health care, police protection, and recreational services that would be aggrevated by the NTPS.

Impact on Commercial Services

The proposed NTPS project will have a positive effect on most commercial services. In general the job is too short-lived to attract local employees from present positions in the commercial services sector. The positive effects come from the wages spent by pipeliners in bars, restaurants, and stores, not to mention motels and RV/camper parks. Problems may occur in the smallest towns, where the pipeliners may overcrowd the few bars and restaurants. Although this imposition will be relatively brief (and, probably, profitable), it could temporarily disrupt the traditional clientele.

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[1]The presumption here is that pipeliners would bring their families with them in the same proportion, whether to counties in which very limited facilities exist, or to counties where extensive facilities are found. In fact, however, available evidence indicates that pipeline workers are very reluctant to bring their families to job sites where minimal public services are available. Moreover, should construction camps be used, the number of workers accompanied by families could be lower still.

TRANSPORTATION IMPACTS

The transportation of workers and materials along the alignment will involve a massive effort. Over a quarter of a million tons of materials will be moved to the pipeline route and 3,345 workers will commute to work sites throughout Montana. Five different work forces will be engaged in constructing different sections of the pipeline in Montana. Each of these will progress on its section from west to east, spending from two weeks to a month in any given construction location. The materials will be unloaded from boxcars and trucked to approximately fourteen[1] stockpile locations along the route (see table 71). From each stockpile, the materials will be transported to the spread as needed. Traffic will be affected for about a month in the vicinity of any particular pipeline location. Volumes will gradually increase until the pipe and other materials are transported to the location, recede slightly, and peak as the construction progresses across this location. The maximum traffic impact will involve 440 workers and forty trucks moving to and from the spread every day. This peak should last only two weeks at any given point, with traffic quickly returning to normal. The "worst case" impact would assume that everyone commutes alone, thus causing 960 trips per day during the peak. Since busing of workers from common collection points to the spread is a frequent procedure on large pipeline construction projects, the actual impact could be considerably less.

Table 72 shows the average daily traffic counts for the affected counties. Traffic counts do not include urban traffic, but this is consistent with the pipeline route's rural character. Impacts on interstate and primary highways will be relatively insignificant, since these are better maintained and constructed, and capable of handling the increased traffic. Secondary roads will receive the most intense impact, for many are unpaved and have lower weight capacities and smaller traffic counts.

Wheatland County has the smallest average traffic flow on its secondary roads; only forty-six cars travel these roads per day. As the spread moves through Wheatland County, traffic volumes on some roads may increase as much as 2,000 percent. This substantial increase in road use may cause congestion at critical intersections.

In the past, construction of transmission lines and pipelines has led to damage of bridges, culverts, and cattle guards when weight per axle restrictions were severely violated. County and state highway officials do not believe that the movement of materials and equipment across the secondary road system would cause any additional problems as long as the legal restrictions are obeyed. It is strongly recommended that the construction contractor contact county authorities before moving equipment and materials into the county. This exchange can identify the marginal roads which may require circumventing, additional bracing for the supporting structure, or reducing axle weights, and could reduce

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[1]This only applies to NTPR. More or fewer may be needed for the alternative routes.

[2]This was the opinion of county surveyors in Richland and Dawson counties, as well as that of several officials of the Montana Department of Highways.

TABLE 71. Potential Storage/Stockpile Locations by Route.

NTPR[1]	DNRC Modified[2]	Hi-Line[2]	Raynesford[2]	St. Ignatius[2]	Arlee[2]	Knox Pass[2]
Thompson Falls	Thompson Falls	Thompson Falls	Thompson Falls	Thompson Falls	Thompson Falls	Thompson Falls
Plains	Plains	Plains	Plains	Plains	Plains	Plains
Frenchtown	Frenchtown					
Missoula	Missoula	Huson	Huson	Dixon	Dixon	Frenchtown
Drummond	Drummond	Missoula	Missoula	Missoula	Missoula	Missoula
Avon	Avon	Ovando	Ovando	(East of Missoula, same places as NTPR)		
East Helena	East Helena	Wolf Creek	Wolf Creek			
Townsend	Townsend	Great Falls	Great Falls			
Ringling	Ringling	Fort Benton	Belt			
Harlowton	Harlowton	Havre	Denton			
Winnett	Winnett	Malta	Lewistown			
Miles City	Jordan	Scobey	Winnett			
Richey	Circle	Plentywood	Jordan			
Williston, N.D.	Sidney	Williston, N.D.	Circle			
			Sidney			

[1]SOURCE: NTPC 1978b.

[2]Mountain West Research, Inc. 1979.

TABLE 72. Average Daily Rural Traffic Flows, Montana, 1978[1].

County	Interstate and Primary	Secondary[2]
Blaine	1226.7	150.7
Broadwater	1663.3	189.2
Carbon	1126.9	330.2
Cascade	2329.1	307.0
Chouteau	1028.5	134.9
Custer	1169.9	74.1
Daniels	380.7	190.6
Dawson	1320.3	164.5
Deer Lodge	2030.6	317.8
Fergus	626.5	194.2
Gallatin	1979.5	818.2
Garfield	321.6	64.1
Golden Valley	967.3	89.4
Granite	2111.0	93.0
Hill	2026.5	169.3
Jefferson	1841.4	447.0
Judith Basin	1222.0	85.6
Lewis & Clark	1731.2	403.1
McCone	803.1	131.0
Meagher	422.8	142.2
Missoula	2952.8	885.7
Musselshell	911.6	59.0
Park	1612.4	188.8
Petroleum	383.5	106.3
Phillips	708.0	155.5

TABLE 72. (cont'd)

County	Interstate and Primary[2]	Secondary[2]
Powell	1791.7	160.1
Prairie	228.0	102.2
Richland	1012.3	125.2
Roosevelt	1034.1	114.0
Rosebud	869.9	73.5
Sanders	833.9	117.9
Sheridan	561.4	164.3
Silver Bow	2756.2	308.4
Stillwater	2638.8	293.0
Sweet Grass	2384.3	182.4
Treasure	2542.0	124.3
Valley	918.4	102.6
Wheatland	676.2	46.3
Yellowstone	3365.3	610.1
State	1433.2	220.8

[1]SOURCE: Montana Department of Highways.

[2]Interstate and primary roads are the major arteries for interstate and intercounty travel, while secondary roads are major collectors. Secondary roads generally include and more heavily used county roads, paved and unpaved.

costs to both parties. If the roads are damaged from illegally heavy loads, the county could sue the contractor, who could be required to pay all restriction costs. Thus, the cooperation of the county and construction officials could eliminate these costs and subsequent ill will.

Pipeline road crossings pose another potential impact to the transportation system. The state requires contractors to bore under all state highways whenever possible. Open trenching would be allowed only when the road bed is solid rock, or for some county roads. The state and some counties have a permit procedure for any construction affecting their roads. The permit requires only a nominal fee, but obligates the contractor to incur all damages and costs which might arise from construction. When authorities deem it necessary, flagmen and inspectors would be provided to supervise the road crossing. The construction contractor would be required to pay for these additional public costs, the repair of the roads, and future road maintenance costs caused by settling or inadequate patching.

IMPACTS ON DEVELOPED RECREATION AREAS

Construction of the NTPS would have two potential impacts on developed recreation areas along the route alternatives. First, construction might physically disturb a recreation area by building the pipeline through it or nearby. Second, construction workers with campers, RVs or travel trailers might temporarily locate at such areas, occupying some privately operated campsites that would normally be used by recreational visitors.

Physical Disturbance of Recreation Areas

None of the proposed route alternatives pass through developed recreation sites. However, the Knox Pass-St. Regis route runs less than a kilometer from three USDA Forest Service campgrounds: Cabin City (off the interstate near DeBorgia), Sloway (south of St. Regis on the interstate), and Quartz Flat (16 to 18 km) [10 to 12 mi] south of Superior on the interstate). Because the Sloway and Quartz Flat facilities are close to Interestate 90, it seems unlikely that the brief period (three to four weeks) of nearby pipeline construction would be more than a minor inconvenience. Construction near the Cabin City site would be of approximately the same duration and, although the disturbance might be greater, the work there would be finished well before summer if the proposed construction calendar is followed.

The other recreation area near where construction of the pipeline would take place is Canyon Ferry Lake. In particular, the Indian Road campground at Townsend is within 100 to 200 meters of the NTPR. However, work on the pipeline is scheduled to move through Townsend in April to May, long before Indian Road would receive its summer season use. No significant impact is anticipated.

Use of Recreation Areas by Pipeline Workers

In general, conflicts between pipeliners and regular visitors and tourists for space and facilities in developed recreation areas should not be a problem. This is primarily due to USDI Forest Service and State Park regulations that restrict the use of such areas to recreational activities only. Thus, in theory, pipeliners are not allowed to stay in recreation area campsites. To be sure, cases to the contrary will occur, but proper briefings of the workers by the constractors coupled with some enforcement by recreation area supervisors should hold the problem to a minimum. The primary areas where such problems might be anticipated would be along sections 4, 5, and 6 of the NTPR, the Knox Pass-St. Regis alternative and Canyon Ferry Lake.

At the same time, private campgrounds -- particularly, trailer/RV parks -- could receive greatly increased demand due to the approximately 100 workers who would seek to stay there. Tourists turned away from such facilities during the summer months because of pipeliners' occupancy could end up creating additional demands on public campgrounds. The degree to which this might occur is speculative at this point.

LONG-TERM IMPACTS

Although construction period effects dominate the socioeconomic impact analysis of the NTP Project, several long-term effects of significance can be identified as well. These include economic (employment and income), fiscal (primarily property and corporate income taxes), and land use effects. Among these effects, land use is the only one that could be considered adverse.

ECONOMIC/DEMOGRAPHIC IMPACTS

The economic impact of NTPS over the long run would be a permanent increase in employment and resultant income effects. As long as the pipeline assures a stead supply of feedstock to Montana refineries and enables their continued operation, negative economic events would be avoided only if NTP is the most cost-effective alternative. An analysis of what the closing of those refineries would mean to the area economy is beyond the scope of this assessment. Instead, the direct and induced employment/income effects of the NTPS Project and their implications for population growth are examined.

After the construction force completes its work, only a small number of employees are required to operate the pipeline system. Billings probably would be the location of three permanent operation staffs -- corporate management, operations and maintenance, and operation and maintenance system support. The total number of positions involved is forty-eight. Table 73 lists the required positions for these permanent staff members and identifies those jobs which could be filled by the local labor market.

There is no excess supply of pipeline managers or professionals in the Billings labor market. Billings is a growing regional center, attracting new business development and increasingly skilled workers. Although some of these professional positions in pipeline management may well be filled by Billings residents, replacements would be needed to take their previous positions. If there is no slack in the professional market, eventually a nonlocal might be called in to take a position that directly or indirectly results from the opening of these additional positions. Thus, the twenty-six management, professional, and specialized skill positions are assumed to be supplied by nonresidents. The remaining twenty-two jobs can be filled by local workers without significantly affecting the aggregate regional labor supply.

There are no totally adequate data sources to estimate the demographic characteristics of this type of immigrating labor force. Since these workers are mostly professional, they would tend to be better educated and older than construction or operation workers, but their family characteristics would probably be more similar to power plant operation workers, of which 82.7 percent are married and have an average of 1.9 children (Wieland et al. 1977). The average earning of this work force are estimated at $20,000/year position for the operations and maintenance staff and $22,000/year for the management staff, adding $1,020,000 to basic regional annual income. In summary, the direct long run economic/demographic impacts are:

TABLE 73. Long-Term Manpower Requirements

Classification	Employees	Local/Nonlocal[1]
President	1	N
Administrative Assistant	1	N
Vice President-Operations	1	N
Vice President-General Counsel	1	N
Vice President-Financial	1	N
Manager of Operations	1	N
Right of Way Supervisor	1	N
Manager of Purchasing	1	N
Manager of Personnel	1	N
Manager of Engineering	1	N
District Superintendent	1	N
Senior Engineer	1	N
Electronics Supervisor	1	N
Measurement Supervisor	1	N
Corrosion Supervisor	1	N
Supervisor of Operations & Maintenance	1	N
Auditor	1	N
"Ad Valorem" Tax Manager	1	N
Chief Electrical Technician	1	N
Electrician Technician	1	N
Chief Mechanical Technician	1	N
Buyer	1	N
Safetyman	1	N
Draftsman	1	L
Accounting Personnel	6	L
Pipeliners	2	N
Technicians	2	L
Truck Driver	1	L
Station Attendants	3	L
Clerk-Secretary	5	L
Secretary	4	L
TOTAL	48	L=22 N=26

[1]N represents positions which can be filled by nonlocal residents.
L represents positions which can be filled by the local labor pool.

Employment -- forty-eight workers

Income -- $1,020,000/year

Population Increase -- eighty-seven including twenty-six workers, twenty-one spouses, and forty children

Other impacts would occur due to the induced effect of the additional income. Using Chalmers' unadjusted income multiplier for third order market areas (2.02)(Mountain West Research, Inc. 1979), income will increase by another $1.04 million. Since the induced income would be produced every year, local businessmen will eventually respond by hiring additional help. The method used to calculate the induced employment is to divide the induced income by the Bureau of Economic Analysis' (BEA) average personal income per employee for Yellowstone County. Unfortunately, 1978 BEA data are not available, so a simple time trend of past BEA estimates is used to predict an average personal income per employee of $14,830 for 1978. Thus, seventy additional jobs could be induced in Yellowstone County to provide services to the NTPC permanent work force. Since the area's unemployment rate is low, under five percent, and employment is growing, one nonlocal worker would immigrate for every two additional non-basic jobs (USDOE 1978). Therefore, thirty-five of these non-basic workers would immigrate, bringing with them twenty-nine spouses and fifty-five children for a total induced population growth of 119. The total economic/demographic long-run effects of NTPC are shown in table 74:

TABLE 74. Effects of Direct and Induced Income from Northern Tier Pipeline System.

	ANNUAL INCOME	EMPLOYMENT	POPULATION
Direct	$1,020,000	48	87
Indirect	1,040,000	70	119
Total	$2,060,000	118	206

This population increase represents less than 0.3 percent growth in Billings, and will create no major difficulties. There are no significant capacity problems in Billings area schools, hospitals, or other public services.

FISCAL IMPACTS

The long-term fiscal impacts of the NTP Project would consist primarily of corporate income and property revenues. The former are quite difficult to estimate, while the latter are somewhat easier.

Corporate Income Tax

The NTPC's taxable income is uncertain or unknown at present; it might be worthwhile to examine, on the basis of reasonable hypotheses, what order-of-magnitude implications the company's operations may have for Montana. Therefore, the corporate income taxes of a hypothetical example have been worked out below.

Montana taxes the net income of corporations at 6.75 percent, where net income is defined by a three-factor formula based on Montana's proportion of sales, property, and payroll. Since the difference in property value among the route alternatives is less than two percent, corporate tax estimates made for one route will probably be reasonably accurate for the other two. The estimate here is based on relevant characteristics of the NTPR.

The most recent official estimate of the capital costs of NTPS is $1.2 billion (NTPC 1979a) plus line fill costs and interest during construction. Line fill costs (12.4 million barrels at $15/barrel) are estimated at $186 million, and interest during construction is estimated at $140 million; the total capital cost of NTPS would thus amount to around $1.5 billion. NTPS plans on a 75/25 debt/equity ratio, so the owners' equity would amount to $375 million. With an allowed rate of return of twelve percent net annual income will be $45 million; if the allowed return is fifteen percent net income will be $55.25 million. Assuming a fifty percent federal corporate income tax rate, allowable before tax income will be $90 million at a twelve percent return and $112.5 million at fifteen percent.

As discussed above, Montana will consider thirty-three percent of corporate taxable income as taxable in Montana. The state corporate income tax rate is 6.75 percent. Thus annual state corporate tax revenues would amount to $2.025 million if FERC allows a twelve percent return on investment, and $2.531 million if a fifteen percent return is allowed.

Although the potential state revenues appear substantial, they are based on a hypothetical case. It is possible that NTPC would have zero or negative net income in one or more years, depending on the levels of throughput, tax credits, interest charges, or depreciation allowances.

Property Taxes

The long-term value of the Northern Tier Pipeline Company is uncertain. It will depend upon, among other factors, the profitability and market value of the company. The recent turn of events (for example, the Iranian Revolution, OPEC price increases, and the accident at Three Mile Island) may improve the profit and market value prospects of NTPC. But there is no reasonable

method to quantify the effect of these events upon NTPC's future assessed valuation. Because of this inherent uncertainty, two alternative projections of long-term tax impacts are presented. The conservative approach assumes that income and market value of NTPC does not increase throughout its life and that a straight-line depreciation of its assets would be allowed by the tax assessors. The results of this approach are shown in tables 75 through 79. A less conservative approach assumes that the value of the firm increases sufficiently to compensate for the depreciation associated with the pipeline operation. Thus, this projection assumes that the value of NTPC remains constant over its life. The tax implications of this assumption are shown in tables 80 through 84, and result in a substantially higher total tax payment than the conservative approach. The actual tax payments arising from this pipeline project would probably lie somewhere between these two extremes, but in any case, a substantial increase in local revenues may result.

Other economic effects would result from the use of the taxes paid by NTPC. These taxes are primarily corporate and property taxes, estimates of property tax revenues vary from approximately $11.5 to $15 million for 1982 and from $3.5 to $15 million for 2010, depending on the route and the assumptions made about depreciation. If these additions to the public revenues are spent, then an economic/demograpic impact would result in the same fashion as any other increase in basic income. If taxes are reduced by the amount of NTPC tax payments, then the economic impact would be lessened by approximately thirty percent. This is because people do not spend all of their tax savings; it results in the economic multipliers being reduced by the percent of their tax rebates not spent in Montana.

ULTIMATE PHASE CONSTRUCTION

Ultimate phase construction activities involve the addition of pumping units to points on the system boosting capacity from the original 709,000 bpd to 933,000 bpd by 1985. To reach ultimate capacity by 1985, pumping capacity additions must be added in 1984. The addition of pumps to existing stations would require a minimum of labor. However, on three of the alternative routes, entire pump stations would be added.

Raynesford	Hi-Line	Knox Pass
Pump Station	#6H Harlem	#2K Mineral County
Petroleum County	#8H Opheim	

Major additions would also be made to the Jordan pump station on the NTPR. The investment cost value of these ultimate phase components has been taken into account, but their potential socioeconomic impacts have not been estimated here, because these additions would employ relatively few persons over an eight to ten month period, and the impact would be negligible.

TABLE 75. Projected Tax Revenues,[1] Assuming Straight-Line Depreciation of Value and Current Property Tax Rates NTPR. ($000)

County	1982	1983	1984	1985	1986	1987	1988	1989
Sanders	988	954	920	896	862	828	794	760
Missoula	1,530	1,477	1,424	1,386	1,333	1,280	1,227	1,174
Granite	242	234	226	220	212	204	196	187
Powell	760	734	708	689	663	637	610	584
Lewis and Clark	698	674	650	633	609	585	561	537
Jefferson	28	27	26	25	24	23	22	21
Broadwater	720	695	670	652	627	602	677	648
Meagher	699	674	650	633	609	585	561	537
Wheatland	773	746	719	700	673	646	619	592
Golden Valley	277	267	257	250	240	230	220	210
Musselshell	214	207	200	195	188	180	173	165
Fergus	41	40	39	38	37	36	35	33
Petroleum	435	420	405	394	378	363	348	333
Garfield	1,245	1,202	1,160	1,129	1,086	1,043	1,000	957
McCone	897	866	835	813	782	751	720	689
Dawson	23	22	21	20	19	18	17	16
Richland	784	757	730	711	684	657	630	603
Roosevelt	56	54	52	51	49	47	45	43
TOTAL[2]	10,461	10,100	9,739	9,480	9,116	8,752	8,386	8,023

TABLE 75. (cont'd)

County	1990	1991	1992	1993	1994	1995	1996	1997
Sanders	726	691	657	622	588	553	519	484
Missoula	1,121	1,068	1,015	962	909	856	803	950
Granite	179	170	162	153	145	136	128	119
Powell	557	531	505	478	451	425	398	372
Lewis and Clark	513	489	465	441	417	393	368	344
Jefferson	20	19	18	17	16	15	14	13
Broadwater	619	590	561	532	503	473	444	414
Meagher	513	489	465	441	416	392	368	344
Wheatland	565	538	511	484	457	430	403	376
Golden Valley	200	190	181	171	162	152	143	133
Musselshell	158	150	143	135	128	120	113	105
Fergus	32	30	29	27	26	24	23	21
Petroleum	318	303	288	273	258	243	228	213
Garfield	914	871	828	785	741	698	654	611
McCone	658	627	596	565	534	503	472	441
Dawson	15	14	13	12	11	10	9	8
Richland	576	549	522	495	468	441	414	386
Roosevelt	41	39	37	35	33	31	29	27
TOTAL[2]	7,659	7,294	6,930	6,566	6,202	5,838	5,474	5,110

TABLE 75. (cont'd)

County	1998	1999	2000	2001	2002	2003	2004	2005
Sanders	450	415	381	346	312	277	243	208
Missoula	882	814	746	678	610	543	475	408
Granite	111	102	94	85	76	68	60	51
Powell	345	319	292	266	239	213	186	160
Lewis and Clark	319	295	270	246	221	197	172	148
Jefferson	12	11	10	9	8	7	6	5
Broadwater	385	355	326	296	267	237	208	178
Meagher	319	295	270	246	221	197	172	148
Wheatland	350	323	296	269	242	215	188	161
Golden Valley	124	114	105	95	86	76	65	56
Musselshell	98	90	83	75	68	60	53	45
Fergus	20	18	17	15	14	12	11	9
Petroleum	198	183	168	153	138	123	108	93
Garfield	567	524	480	437	393	350	306	263
McCone	410	379	348	316	385	342	299	257
Dawson	7	6	6	5	5	4	4	3
Richland	359	331	304	276	250	272	194	166
Roosevelt	25	23	21	19	17	15	13	11
TOTAL[2]	4,746	4,382	4,018	3,654	3,290	2,926	2,562	2,198

TABLE 75. (cont'd)

County	2006	2007	2008	2009	2010	Total Including 1981
Sanders	174	139	105	70	36	15,984
Missoula	340	273	205	138	70	24,758
Granite	43	34	26	17	9	3,926
Powell	133	107	80	54	27	12,293
Lewis and Clark	123	99	74	50	25	11,292
Jefferson	4	32	24	16	8	454
Broadwater	149	119	90	60	30	11,636
Meagher	123	99	74	50	25	11,323
Wheatland	134	107	80	54	27	12,512
Golden Valley	47	38	29	19	10	4,473
Musselshell	38	30	23	15	8	3,456
Fergus	8	6	5	3	2	657
Petroleum	78	63	47	32	16	7,038
Garfield	219	176	132	88	45	20,145
McCone	214	172	129	87	44	14,514
Dawson	3	2	2	1	1	375
Richland	139	111	84	56	29	12,715
Roosevelt	9	7	5	3	2	907
TOTAL[2]	1,834	1,470	1,106	742	378	169,258

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 76. Projected Tax Revenues,[1] Assuming Straight-Line Depreciation of Value DNRC Modified Route.

($000)

County	1982	1983	1984	1985	1986	1987	1988	1989
Sanders	990	956	922	897	862	828	794	760
Missoula	1,601	1,546	1,491	1,451	1,395	1,339	1,283	1,227
Granite	469	453	437	425	409	393	377	361
Powell	590	570	550	535	514	493	472	452
Lewis and Clark	692	668	644	627	603	579	555	531
Jefferson	28	27	26	25	24	23	22	21
Broadwater	728	703	678	660	635	610	585	560
Meagher	707	683	659	641	616	591	566	541
Wheatland	770	743	716	697	670	643	616	489
Golden Valley	279	269	259	252	242	232	222	212
Musselshell	216	209	202	197	189	181	173	165
Fergus	41	40	39	38	37	36	35	33
Petroleum	446	431	416	405	389	373	357	342
Garfield	1,228	1,186	1,144	1,113	1,070	1,027	984	941
McCone	622	601	580	565	543	521	499	477
Dawson	444	429	414	403	388	373	357	342
Richland	675	652	629	612	588	565	541	518
Roosevelt	57	55	53	52	50	48	46	44
TOTAL[2]	10,635	10,268	9,901	9,637	9,267	8,897	8,527	8,157

TABLE 76. (cont'd)

County	1990	1991	1992	1993	1994	1995	1996	1997
Sanders	726	691	657	622	588	553	519	484
Missoula	1,171	1,115	1,059	1,003	947	891	835	779
Granite	345	328	312	296	280	264	247	231
Powell	431	411	390	370	349	329	308	288
Lewis and Clark	508	484	460	436	412	388	364	340
Jefferson	20	19	18	17	16	15	14	13
Broadwater	535	510	485	460	434	409	383	358
Meagher	516	491	466	441	417	393	368	344
Wheatland	562	535	508	481	454	427	400	373
Golden Valley	202	192	182	172	162	152	143	133
Musselshell	158	150	143	135	128	120	113	105
Fergus	32	30	29	27	26	24	23	21
Petroleum	326	311	295	280	264	249	233	218
Garfield	898	855	812	769	726	683	640	597
McCone	455	433	411	389	367	345	323	302
Dawson	326	311	295	280	264	249	233	218
Richland	494	471	447	424	400	376	353	330
Roosevelt	42	40	38	36	34	32	30	28
TOTAL[2]	7,786	7,416	7,046	6,676	6,306	5,936	5,566	5,196

TABLE 76. (cont'd)

County	1998	1999	2000	2001	2002	2003	2004	2005
Sanders	450	415	381	346	312	277	243	208
Missoula	724	668	613	557	502	446	390	335
Granite	215	199	182	166	149	133	116	100
Powell	267	246	226	206	185	165	145	124
Lewis and Clark	317	293	269	245	221	197	172	148
Jefferson	12	11	10	9	8	7	6	5
Broadwater	332	307	281	256	230	205	179	154
Meagher	319	295	270	246	221	196	172	148
Wheatland	246	227	208	189	170	151	132	113
Golden Valley	124	114	105	95	86	76	67	57
Musselshell	98	90	83	75	68	60	53	45
Fergus	20	18	17	15	14	12	11	9
Petroleum	202	187	171	156	140	125	109	94
Garfield	554	511	469	427	384	342	299	257
McCone	280	259	237	216	194	173	151	130
Dawson	202	187	171	156	140	125	109	94
Richland	306	283	259	236	212	189	165	142
Roosevelt	26	24	22	20	18	17	15	13
TOTAL[2]	4,826	4,456	4,086	3,716	3,346	2,976	2,606	2,236

TABLE 76. (cont'd)

County	2006	2007	2008	2009	2010	Total Including 1981
Sanders	174	139	105	70	36	16,017
Missoula	280	224	169	113	58	25,903
Granite	83	67	50	34	17	7,586
Powell	103	83	62	42	21	9,541
Lewis and Clark	123	99	74	50	25	11,200
Jefferson	4	3	2	1	1	461
Broadwater	128	103	77	52	26	11,792
Meagher	123	99	74	50	25	11,450
Wheatland	94	75	56	38	19	12,467
Golden Valley	48	38	29	19	10	4,521
Musselshell	38	30	23	15	8	3,488
Fergus	8	6	5	3	2	657
Petroleum	78	63	47	32	16	7,211
Garfield	214	172	129	87	44	20,678
McCone	108	87	65	44	22	10,073
Dawson	78	63	47	32	16	7,180
Richland	118	95	71	48	24	10,918
Roosevelt	11	9	7	5	3	923
TOTAL[2]	1,866	1,496	1,125	755	384	172,093

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 77. Projected Tax Revenues,[1] Assuming Straight-Line Depreciation of Value Hi-Line Route.

($000)

County	1982	1983	1984	1985	1986	1987	1988	1989
Sanders	1,000	966	931	906	871	836	801	766
Missoula	1,770	1,709	1,648	1,604	1,542	1,480	1,418	1,356
Powell	403	389	375	365	351	337	323	309
Lewis and Clark	1,020	985	950	925	889	853	818	782
Cascade	1,352	1,305	1,258	1,225	1,178	1,131	1,084	1,037
Chouteau	1,056	1,020	984	958	921	884	847	810
Hill	637	615	593	577	554	532	510	488
Blaine	870	840	810	789	759	729	699	669
Phillips	879	849	819	797	766	735	704	673
Valley	923	891	859	836	804	772	740	708
Daniels	826	798	769	749	720	691	662	633
Sheridan	790	763	735	716	689	661	634	606
TOTAL[2]	11,527	11,130	10,732	10,448	10,047	9,646	9,245	8,844

TABLE 77. (cont'd)

County	1990	1991	1992	1993	1994	1995	1996	1997
Sanders	731	696	661	626	591	556	521	486
Missoula	1,294	1,232	1,171	1,109	1,048	986	925	863
Powell	295	281	267	253	239	225	211	197
Lewis and Clark	747	711	676	640	605	509	534	498
Cascade	990	943	896	850	803	756	709	662
Chouteau	773	736	699	662	625	588	551	514
Hill	466	444	423	401	379	357	335	313
Blaine	639	609	579	549	519	489	459	428
Phillips	642	611	581	550	520	489	459	428
Valley	676	644	612	580	548	516	483	451
Daniels	604	575	546	517	488	459	430	401
Sheridan	579	551	524	496	469	441	414	386
TOTAL[2]	8,443	8,042	7,641	7,340	6,933	6,526	6,119	5,712

TABLE 77. (cont'd)

County	1998	1999	2000	2001	2002	2003	2004	2005
Sanders	451	416	381	346	312	277	243	208
Missoula	802	740	679	617	556	494	433	371
Powell	183	169	155	141	127	113	99	85
Lewis and Clark	463	427	392	356	321	285	250	214
Cascade	615	568	520	473	426	379	332	285
Chouteau	477	440	403	366	330	293	257	220
Hill	291	269	247	227	204	181	158	136
Blaine	398	367	337	306	276	245	215	184
Phillips	398	367	337	306	276	245	215	184
Valley	419	387	355	323	291	259	227	195
Daniels	372	343	315	286	258	229	201	172
Sheridan	359	331	304	276	249	221	194	166
TOTAL[2]	5,305	4,898	4,491	4,084	3,677	3,270	2,863	2,456

TABLE 77. (cont'd)

County	2006	2007	2008	2009	2010	Total Including 1981
Sanders	174	139	105	70	36	15,242
Missoula	310	248	187	125	64	26,964
Powell	71	57	43	29	15	6,141
Lewis and Clark	179	143	108	72	37	15,536
Cascade	238	191	144	97	49	20,602
Chouteau	184	147	111	74	38	16,081
Hill	113	91	68	46	23	9,705
Blaine	154	123	93	62	32	13,254
Phillips	154	123	93	62	32	13,386
Valley	163	131	99	66	34	14,064
Daniels	144	115	87	58	30	12,591
Sheridan	139	111	84	56	29	12,031
TOTAL[2]	2,049	1,642	1,235	828	422	175,595

[1]1978 dollars.

[2]Totals may not add due to rounding

TABLE 78. Projected Tax Revenues,[1] Assuming Straight-Line Depreciation of Value

Raynesford Route.

($000)

County	1982	1983	1984	1985	1986	1987	1988	1989
Sanders	967	934	901	881	847	813	779	745
Missoula	1,727	1,667	1,607	1,571	1,511	1,451	1,391	1,331
Powell	393	379	365	357	343	329	315	301
Lewis and Clark	994	960	926	906	871	836	801	766
Cascade	1,556	1,502	1,448	1,416	1,362	1,308	1,254	1,200
Judith Basin	505	488	471	461	443	425	407	389
Fergus	1,100	1,062	1,024	1,001	963	925	887	849
Petroleum	512	494	476	465	447	429	411	393
Garfield	1,261	1,218	1,174	1,148	1,103	1,059	1,015	971
McCone	617	596	575	562	540	518	496	474
Dawson	436	421	406	397	382	367	352	337
Richland	664	641	618	604	581	558	535	512
Roosevelt	55	53	51	50	48	46	44	42
TOTAL[2]	10,734	10,364	9,993	9,772	9,397	9,022	8,647	8,272

TABLE 78. (cont'd)

County	1990	1991	1992	1993	1994	1995	1996	1997
Sanders	711	677	643	609	575	541	507	473
Missoula	1,271	1,210	1,150	1,090	1,030	970	910	850
Powell	287	273	259	245	231	217	203	190
Lewis and Clark	731	696	661	625	591	556	521	486
Cascade	1,146	1,092	1,038	984	929	875	820	766
Judith Basin	371	353	335	317	299	281	263	246
Fergus	811	772	733	695	657	618	580	541
Petroleum	375	357	339	321	303	285	267	249
Garfield	927	883	839	795	751	707	663	619
McCone	453	431	410	388	367	345	324	302
Dawson	322	307	292	277	262	247	232	217
Richland	489	466	443	420	397	373	350	327
Roosevelt	40	38	36	34	32	30	28	26
TOTAL[2]	7,897	7,522	7,147	6,772	6,397	6,022	5,647	5,272

TABLE 78. (cont'd)

County	1998	1999	2000	2001	2002	2003	2004	2005
Sanders	439	405	371	337	303	270	236	203
Missoula	790	729	669	608	548	487	427	366
Powell	176	163	149	136	122	109	95	82
Lewis and Clark	451	416	381	347	312	278	243	209
Cascade	711	657	602	549	494	439	384	330
Judith Basin	228	211	193	176	158	141	123	106
Fergus	503	464	426	387	349	310	272	233
Petroleum	231	213	195	177	159	141	123	106
Garfield	575	531	487	443	399	355	311	267
McCone	281	259	238	216	195	173	152	130
Dawson	202	187	171	156	140	125	109	94
Richland	304	281	258	235	212	189	166	142
Roosevelt	24	22	20	18	16	14	12	10
TOTAL[2]	4,899	4,524	4,149	3,774	3,399	3,024	2,648	2,273

TABLE 78. (cont'd)

County	2006	2007	2008	2009	2010	Total Including 1981
Sanders	169	136	102	69	36	15,707
Missoula	306	245	185	124	64	28,068
Powell	68	55	41	28	14	6,393
Lewis and Clark	174	140	105	71	37	16,162
Cascade	275	221	166	112	58	25,287
Judith Basin	88	71	53	36	19	8,199
Fergus	195	156	118	79	41	17,874
Petroleum	88	71	53	36	19	8,324
Garfield	223	179	135	91	47	20,497
McCone	109	88	66	44	23	10,021
Dawson	78	63	47	32	17	7,084
Richland	119	95	72	48	25	10,790
Roosevelt	8	6	5	3	2	895
TOTAL[2]	1,897	1,522	1,146	771	398	174,405

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 79. Projected Tax Revenues,[1] Assuming Straight-Line Depreciation of Value, Arlee, Knox Pass, and St. Ignatius Routes.

($000)

Route/ County	1982	1983	1984	1985	1986	1987	1988	1989
ARLEE								
Sanders	1,720	1,661	1,602	1,546	1,487	1,428	1,369	1,309
Lake	212	205	198	191	184	176	169	-162
Missoula	1,250	1,207	1,164	1,123	1,080	1,036	993	950
TOTAL[2]	3,181	3,071	2,961	2,858	2,748	2,638	2,528	2,418
KNOX PASS								
Sanders	513	495	477	466	448	430	412	394
Mineral	2,092	2,021	1,948	1,902	1,829	1,756	1,683	1,610
Missoula	1,534	1,482	1,429	1,396	1,342	1,288	1,234	1,180
TOTAL[2]	4,139	3,997	3,853	3,763	3,619	3,475	3,331	3,186
ST. IGNATIUS								
Sanders	1,127	1,088	1,049	1,021	982	943	904	865
Lake	547	528	509	495	476	457	438	419
Missoula	604	583	562	547	526	505	484	463
Powell	934	902	870	847	814	781	749	716
Others	6,941	6,702	6,463	6,386	6,141	5,896	5,651	5,406
TOTAL[2]	10,154	9,804	9,454	9,200	8,846	8,493	8,140	7,787

TABLE 79. (cont'd)

Route/ County	1990	1991	1992	1993	1994	1995	1996	1997
ARLEE								
Sanders	1,250	1,191	1,131	1,072	1,012	953	893	833
Lake	155	148	141	134	127	120	113	105
Missoula	907	864	821	778	736	693	650	607
TOTAL[2]	2,308	2,198	2,088	1,978	1,868	1,758	1,648	1,538
KNOX PASS								
Sanders	376	358	340	322	304	286	268	250
Mineral	1,537	1,464	1,391	1,318	1,245	1,172	1,099	1,026
Missoula	1,126	1,073	1,019	966	912	859	805	752
TOTAL[2]	3,042	2,897	2,753	2,608	2,464	2,320	2,175	2,030
ST. IGNATIUS								
Sanders	826	787	748	709	670	631	592	553
Lake	400	381	362	343	324	305	286	267
Missoula	442	421	400	379	358	337	316	295
Powell	684	651	619	586	554	521	489	456
Others	5,161	4,916	4,671	4,426	4,181	3,936	3,691	3,446
TOTAL[2]	7,434	7,081	6,728	6,375	6,022	5,669	5,315	4,962

TABLE 79. (cont'd)

Route/ County	1998	1999	2000	2001	2002	2003	2004	2005
ARLEE								
Sanders	774	715	656	596	536	477	417	357
Lake	98	90	83	75	68	60	53	45
Missoula	564	521	478	435	392	348	305	261
TOTAL[2]	1,428	1,318	1,209	1,099	989	879	769	659
KNOX PASS								
Sanders	232	214	196	178	160	142	124	106
Mineral	953	880	807	734	661	588	515	442
Missoula	698	645	591	538	484	431	377	323
TOTAL[2]	1,886	1,741	1,597	1,425	1,283	1,141	999	857
ST. IGNATIUS								
Sanders	495	457	419	381	343	303	267	229
Lake	248	229	210	191	172	153	134	115
Missoula	274	253	232	211	190	169	148	127
Powell	424	391	359	326	294	261	229	196
Others	3,200	2,955	2,709	2,464	2,218	1,973	1,727	1,482
TOTAL[2]	4,608	4,255	3,901	3,548	3,194	2,841	2,487	2,134

TABLE 79. (cont'd)

Route/ County	2006	2007	2008	2009	2010	Total Including 1981
ARLEE						
Sanders	298	238	179	119	60	24,111
Lake	-38	30	23	15	8	2,968
Missoula	218	174	131	87	44	17,524
TOTAL[2]	549	439	329	220	110	44,603
KNOX PASS						
Sanders	88	71	53	36	18	8,299
Mineral	364	296	223	150	77	33,854
Missoula	270	217	163	110	56	24,851
TOTAL[2]	715	573	432	290	149	67,020
ST. IGNATIUS						
Sanders	191	153	115	77	39	18,238
Lake	96	77	58	39	20	8,853
Missoula	106	85	64	43	22	9,776
Powell	164	131	99	66	34	15,126
Others	1,236	991	745	500	254	112,300
TOTAL[2]	1,780	1,427	1,073	720	366	164,302

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 80. Projected Tax Revenues,[1] Assuming Constant Value, NTPR.

($000)

County	Annual Tax Liability		Total Including 1981
	1982-1984	1985-2010	
Sanders	1,029	1,036	31,045
Missoula	1,593	1,604	48,066
Granite	253	255	7,640
Powell	791	796	23,663
Lewis and Clark	727	732	21,935
Jefferson	29	29	870
Broadwater	750	755	22,625
Meagher	728	733	21,966
Wheatland	805	810	24,275
Golden Valley	287	289	8,661
Musselshell	222	224	6,711
Fergus	42	42	1,260
Petroleum	503	506	15,165
Garfield	1,296	1,304	39,080
McCone	934	940	28,170
Dawson	24	24	720
Richland	818	824	24,691
Roosevelt	59	59	1,769
TOTAL[2]	10,891	10,966	328,611

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 81. Projected Tax Revenues,[1] Assuming Constant Value, DNRC Modified Route.

($000)

County	Annual Tax Liability		Total Including 1981
	1982-1984	1985-2010	
Sanders	1,030	1,040	31,154
Missoula	1,667	1,683	50,415
Granite	488	493	14,767
Powell	614	620	18,572
Lewis and Clark	720	727	21,778
Jefferson	30	30	899
Broadwater	759	766	22,947
Meagher	736	743	22,258
Wheatland	802	809	24,237
Golden Valley	291	294	8,806
Musselshell	225	227	6,800
Fergus	43	43	1,289
Petroleum	464	468	14,021
Garfield	1,331	1,343	40,233
McCone	648	654	19,591
Dawson	462	466	13,961
Richland	702	709	21,238
Roosevelt	60	61	1,825
TOTAL[2]	11,073	11,176	334,797

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 82. Projected Tax Revenues,[1] Assuming Constant Value, Hi-Line Route.

($000)

County	Annual Tax Liability 1982-1984	Annual Tax Liability 1985-2010	Total Including 1981
Sanders	1,037	1,047	31,368
Missoula	1,835	1,853	55,514
Powell	418	422	12,643
Lewis and Clark	1,057	1,067	33,003
Cascade	1,402	1,415	42,396
Choteau	1,094	1,104	33,078
Hill	660	666	19,955
Blaine	902	911	27,292
Phillips	911	920	27,562
Valley	957	966	28,942
Daniels	857	865	25,916
Sheridan	819	827	24,776
TOTAL[2]	11,950	12,064	361,438

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 83. Projected Tax Revenues,[1] Assuming Constant Value and Current Property Tax Rates, Raynesford Route.
($000)

County	Annual Tax Liability		Total Including 1981
	1982-1984	1985-2010	
Sanders	1,007	1,021	30,567
Missoula	1,799	1,823	54,582
Powell	410	416	12,453
Lewis and Clark	1,036	1,050	31,437
Cascade	1,621	1,643	49,191
Judith Basin	525	532	15,928
Fergus	1,146	1,161	34,762
Petroleum	534	541	16,198
Garfield	1,314	1,332	39,879
McCone	642	651	19,490
Dawson	454	460	13,773
Richland	692	701	20,989
Roosevelt	57	58	1,736
TOTAL[2]	11,179	11,329	338,195

[1]1978 dollars.

[2]Totals may not add due to rounding.

TABLE 84. Projected Tax Revenues,[1] Assuming Constant Value, Arlee, Knox Pass, and St. Ignatius Routes. ($000)

Route/ County	Annual Tax Liability 1982-1984	Annual Tax Liability 1985-2010	Total Including 1981
ARLEE			
Sanders	1,790	1,794	53,793
Lake	220	221	6,625
Missoula	1,302	1,305	39,129
TOTAL[2]	3,312	3,320	93,517
KNOX PASS			
Sanders	534	542	16,224
Mineral	2,176	2,209	66,125
Missoula	1,597	1,621	48,524
TOTAL[2]	4,307	4,372	130,873
ST IGNATIUS			
Sanders	1,173	1,184	35,469
Lake	570	575	17,226
Missoula	629	635	19,021
Powell	973	982	29,418
Others[3]	7,226	7,292	218,450
TOTAL[2]	10,571	10,667	319,559

[1]1978 dollars.

[2]Totals may not add due to rounding

[3]Counties on NTPR from Lewis and Clark county line eastward.

ABANDONMENT

The economic life of the pipeline has been established at twenty years (NTPC 1978a), its depreciable life for accounting has been reported at thirty years (NTPC 1978c), while its useful life could extend up to fifty years. At some point, the pipeline may no longer be useful and may be abandoned.

Pipeline abandonment would involve draining oil from the pipeline, digging up the pipe (except perhaps at road and river crossings) and back-filling to restore the right-of-way to its original condition, and dismantling the fixed-site facilities. The time and labor expense required by this process would probably be a good deal less than the original investment cost (USDI 1979). The abandonment process obviously creates many of the same adverse impacts as the construction phase, although for shorter periods of time. Farmlands would be disrupted, noise and dust nuisances would be present, and fewer impacts on lodging can be anticipated. A few positive employment/income effects would accrue to Montana as well.

Should the pipeline be abandoned as a crude oil carrier, it might be worthwhile to consider alternative uses for such a system before proceeding with its dismantling. For example, certain segments might carry irrigation water, or modifications might be made to adapt it to the transport of coal slurries.

CHAPTER FIVE

MITIGATION STRATEGIES

A number of mitigation measures can be used to alleviate problems caused by an influx of pipeline workers into communities along the pipeline route. The most severe potential impact that will require mitigation is the large lodging shortfall in central and eastern Montana, where excess demand for transient quarters will be as high as 364 nonlocal workers per month in one area along the construction spread. Impacts on education facilities and health services are expected to be much less important, and consequently will require less mitigation. Alleviation of the lodging problem will do much to reduce potential adverse effects on health and educational services.

LODGING/HOUSING

NTPC or its contractors will be able to mitigate lodging shortfalls or conflicts, depending on the size of the shortfall and what transient lodging is available in the place where such problems occur by: (1) the addition of mobile home pads to mobile home courts or the construction of new courts, coupled with the lease or purchase of mobile homes; (2) the addition of RV/camper hookups to existing parks; (3) the use of construction camps; (4) doubling up of nonlocal workers in motel rooms; (5) greater reliance on rental housing and rooms in private homes;[1] (6) the use of school and college dormitories or student rental housing in seasons when school is not in session; and (7) changes in the schedule of pipeline construction to avoid overlap when work forces on two sections are likely to locate in the same city at the same time.

PADS AND HOOKUPS

It is possible in several places for NTPC or its contractors either to add to existing mobile home courts or RV/camper parks, or to construct new ones. Addition to or construction of mobile home courts implies that NTPC or its contractors will purchase mobile homes to rent to nonlocal workers. Such a strategy is more apt to succeed where local demand offers good prospects for the resale of the facilities after NTPC construction is finished. In such a case, local investors may be interested in financing the construction of mobile home courts. While local demand will be greatest in larger places, at the same time zoning laws and permitting procedures in larger places (i.e., Missoula, Helena, Great Falls, and Havre) may restrict building of mobile home courts. Courts, therefore, may have to be constructed outside city limits.

The addition of RV/camper hookups to existing facilities assumes that nonlocal workers own such vehicles. It is known that on the average about one-quarter of nonlocal workers bring their lodging with them in the form of RVs, travel trailers, and campers. Additional hookups would allow workers to use their own equipment. Rented trailers, if available, could also be used to house workers on a temporary basis, while hookups are added.

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[1]The rental of sleeping rooms in private homes was a strategy successfully implemented through local advertising by Green Construction Company on the Dome Pipeline in North Dakota.

CONSTRUCTION CAMPS

In those areas along the pipeline route where significant lodging shortfalls are forecast and where an expansion of present transient lodging capacity may not be practical,[1] construction camps are the only alternative.

The construction camp concept is not new in the United States. Companies specializing in the building, moving, and operation of such camps are active both in this country and abroad (Elder International 1979). Construction camps have typically been used on large-scale projects in remote or sparsely populated regions where housing for workers is either inadequate or nonexistent. (The Alaska Pipeline was built almost entirely by workers operating out of construction camps.) While workers are not obligated to stay in construction camps, the free provisions of board and room is usually sufficient incentive for many of them.

General Description

The two general types of construction camps consist of (1) a main camp which houses all of the workers, and (2) a main camp with two or three smaller camps strung out along the construction path. The smaller camps provide only sleeping and sanitary facilities, with all eating and recreation facilities located in the main camp.

Camp Layout

A typical camp would contain the following types of units:

1) Sleepers -- These are dorms that will sleep four to eight persons. Each unit contains a bath and is fully furnished, with all linens supplied by the company. These units meet OSHA regulations governing the number of square feet required per person. Each sleeper unit set up in a mini-camp usually has its own attached generator; units in a main camp are generally serviced by a main central generator. If outside power were readily available it would probably be used instead.

2) Laundry facility

3) Dry storage facility

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[1]It is highly unlikely that any significant commitment of private investment capital will be made because of the anticipated transitory demands of pipeline workers. Thus, major expansion of mobile home courts and RV parks for pipeline workers would only be justified where other long-term demands for such facilities were present. Many proposed actions might not be feasible because of lack of time.

4) Kitchen-diner-recreation unit -- This provides food for all workers in mini-camps. A general rule of thumb is to have a dining area capable of seating sixty percent of the work force, the maximum number anticipated at any one time. The kitchen-dining area is equipped with steam tables and a salad bar. The recreation area may be part of the kitchen-dining area or may be a separate unit. Pool and card facilities are the basic activities provided.

5) Generator unit -- A unit is set up to house the central electrical generator.

6) Water storage and treatment facility plus distribution pipes to units. Water is generally trucked in weekly and treated prior to use.

7) Sewage -- A collection system is set up and the sewage is either pumped directly into a septic tank or is treated in a sewage facility and then pumped into a pit.

8) Cooler-freezer -- This system is attached to or close to the kitchen. Also, a place is provided for workers to store beer.

9) Infirmary -- In some cases, a separate infirmary building is set up.

10) Central light tower -- This illuminates the camp at night.

11) Possible warehouse and vehicle maintenance facility. A large number of crew trucks will be required to haul employees to work, bring in supplies, and provide general service to the camp.

12) Manager's quarters -- This is a separate unit equipped with sleeping and cooking facilities for the use of the four to six camp managers.

Services Provided

The camp provides all furnishings for the different units including linens, towels, and all eating utensils. Meals are served to the workers and lunches prepared for them. Linens are changed regularly, and the workers' laundry is done by the camp staff.

Camp Personnel

The estimates on camp personnel requirements are:

1) Camp management -- Four to six nonlocal people are retained either by the firm setting up the construction camp or by the pipeline company itself.

2) Camp staff -- At least twelve people who serve as cooks, food servers, buspeople, and camp cleanup people (make beds, do linen, laundry, etc.). These people are hired locally.

3) Other camp maintenance personnel -- This is a flexible number and refers to people required to maintain buildings, facilities, and utilities. Some of this may be taken care of by skilled staff on the pipeline crew or by local contract; some people may be hired full-time.

Local Purchases

1) Camp supplies such as groceries, gasoline, and parts are bought on contract from local suppliers. The size of these purchases is dictated by the number of workers being served, size of electric generator, number of buildings, etc.

2) Some maintenance services are purchased in nearby towns.

3) Some meals, drinks, soft goods and supplies and services such as vehicle maintenance may be purchased in nearby towns by workers.

Acreage

The main camp will require approximately ten to fifteen acres. The smaller camps, if set up, will require two to three acres; there are a few locational constraints.

Costs

A rule of thumb for calculating the cost of setting up a camp in the continental U.S. is $5,000 to $6,000 per worker. Thus, the cost of a camp to house 360 workers would be $1.8 million to $2.16 million. This cost covers only the actual establishment of the camp. Moving, operating, and maintaining the camp are additional costs.

Setting Up, Moving, and Site Restoration

1) Setting up -- To set up a camp requires two to three weeks for the initial planning, ten to twelve weeks to get the unit components together and on location, and two weeks to make the camp operational or a total of fourteen to seventeen weeks.

2) Moving -- A camp can be moved up to thirty miles in a day.

3) Site restoration -- Following a camp move, the site is cleaned up.

General Comments

The emphasis in the camps is to provide good food and good beds, and workers are willing to stay in them. In fact, it is estimated by one construction company that eighty to ninety percent of workers would stay in the camp for convenience and because of the quality of the food and lodging. Camps are acceptable to unions.

Camps would be owned or leased either by NTPC or the individual construction contractor. Given the initial investment cost, their most economic use would be along an entire construction section, as opposed to only one or two locations where lodging shortfalls might exist.

OTHER LODGING/HOUSING MITIGATION STRATEGIES

Four other lodging/housing mitigation strategies are feasible.

1) One method of mitigating a minor shortfall (such as will occur in Sanders County) is to promote doubling up of nonlocal workers in motel rooms, RV/camper units, etc.[1] This may happen naturally for workers who originate from the same locality, since obvious savings result. A concerted effort by contractors to organize doubling up when hiring workers is an inexpensive and effective method to overcome minor shortfalls.

2) A strategy which may be particularly effective in larger cities where lodging conflicts could occur between nonlocal workers and summer or Canadian tourists is for contractors to line up, in advance, rental rooms in private homes.[2] The use of advertising and the assistance of community leaders have proven effective in the past. One major missile site contractor (Boeing Aircraft Company) with extensive experience in housing temporary nonlocal workers advises that several months in advance notice, both to local Chambers of Commerce and to schools, is an invaluable aid in acquiring housing and in avoiding conflict. This strategy requires the contractor (or, in some cases, the Chamber of Commerce) to act as a rental agent in listing the available supply of rooms and in matching it with demand by workers.

3) In places where universities or colleges are located, it may be possible to use dormitories and other student lodging during the summer. This strategy is particularly applicable in places where conflict with summer tourists will occur (Missoula and Helena). Several months advance planning is necessary.

4) Under several routes, nonlocal workers associated with pipeline sections 5 and 6 will probably try to locate in the city of Missoula during the same month. When this occurs, it is possible that pipeline workers will occupy over fifty percent of the city's available transient lodging units. An obvious strategy to mitigate possible conflict is to stagger the construction schedules of sections 5 and 6 to avoid overlap.

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[1] Estimated lodging requirements assume no doubling up except for workers with families.

[2] Green Construction Company did this quite successfully in Carrington, North Dakota for its nonlocal workers on the Dome Pipeline.

LODGING/HOUSING MITIGATION STRATEGIES PER CORRIDOR

The purpose of this section is to recommend strategies which may be applicable to particular sections on each route alternative.

Proposed Route (NTPR)

Sanders County. During May and September, lodging shortfalls of 540 person-nights will occur on section 4 and 1,147 person-nights will occur on section 5. Mitigation measures include: (1) doubling up of nonlocal workers; (2) advertising for rooms in private homes; and (3) possible expansion of RV/camper hookups in existing RV parks.

Missoula. If all nonlocal workers acquire temporary lodging in motel rooms and RV/camper hookups, 27.5 percent of all such units in the city will be occupied by pipeline workers during the summer, with the result that many tourists will have difficulty in finding rooms. The most reasonable mitigation measure would be to arrange lodging in the university's dormitories or in other student rental housing. Missoula's population is growing at a rate which may justify the expansion of existing mobile home courts or the construction of new courts; however, the permit process for this land use within the city is time-consuming. Addition of RV/camper hookups to existing parks, advertising for rooms in private homes, and doubling up of nonlocal workers are also possible strategies.

Helena. If all nonlocal workers lodge in motel rooms and RV/camper hookups, fifty percent of all such units will be occupied during summer, creating a serious conflict with tourists. Helena lodges 600 legislators and lobbyists for several months every biennium. The Chamber of Commerce has organized temporary lodging for special events, such as the National High School Rodeo. The most reasonable mitigation measure might be to work thorugh the Chamber of Commerce to acquire rooms in private homes, particularly if pipeline construction occurs as scheduled in 1980 or in any subsequent even-numbered year when the legislature is not in session. Helena's population growth rate may also justify the expansion or construction of mobile home courts (in the county); and, since the city has significant tourist activity, the addition of RV/camper hookups in existing parks may also be feasible. Carroll College in Helena could be approached about the possibility of using student dorms in summer. An initial inquiry at the college (Carroll College 1979), however, revealed that such a strategy would probably not be feasible.

Section 7: Townsend to Roundup. A serious shortfall will occur along section 7, in the towns of Townsend, White Sulphur Springs, Harlowton, and Roundup. The shortfall will take place between May and October and will total 43,588 person-nights, or 46.5 percent of total construction worker lodging demand. The most reasonable mitigation measure appears to be a construction camp capable of lodging over 450 nonlocal pipeline workers. Harlowton contains 166 motel rooms and RV/camper hookups, which could then easily lodge the estimated peak of forty-nine nonlocal workers required for construction of the pump station and delivery facility located nearby.

A camp might be located initially somewhere between Townsend and White Sulphur Springs, for example, and moved every six weeks or so to minimize commuting time between camp and the construction spread.

Section 8: Jordan to North Dakota Border. Cities and towns along section 8 would have a lodging shortfall for the life of the project. A total of 90,162 person-nights, roughly three-quarters of total demand, cannot be accommodated by available motel rooms and RV/camper units along the section. Two construction camps might be called for -- a major camp capable of housing 390 nonlocal pipeline workers, and a smaller camp capable of housing the advance clearing and grubbing crew of thirty workers. With the use of construction camps, Jordan, with fifty-six motel rooms and RV/camper hookups, is capable of housing nonlocal fixed-site workers required to erect the proposed pump station there. Because of competition from oil and gas workers, lodging in Wolf Point, Poplar, and Sidney may not be adequate for fixed-site workers on pump station 18 and the western delivery facility. Those workers might commute from Circle to the construction site northeast of Richey. However, it would probably be more prudent to use a smaller construction camp near the site.

DNRC Modified Route

Sanders County. See NTPR above.

Missoula. In June, forty-two percent of all motel rooms and RV/camper hookups may be occupied by nonlocal workers on both sections 5 and 6, creating serious conflict with summer tourists. The most obvious mitigation measure is to change the construction schedule for one of the sections. However, even without overlap, during July and August over twenty-five percent of available transient lodging facilities will be occupied by workers on section 6. As under the NTPR, a reasonable mitigation measure would be to arrange lodging in places usually occupied by students from the University of Montana during the school year. The addition of RV/camper hookups to existing parks, advertising for rooms in private homes, and doubling up of nonlocal workers are other possibilities.

Deer Lodge. From April through September, a portion of the nonlocal workers associated with section 6 are likely to locate in Deer Lodge. The peak lodging impact will occur in August and September, when over fifty percent of the city's known transient lodging facilities will be occupied by pipeline workers and their families. Conflict with summer tourists should be expected. Because the impact is short-term, the most reasonable mitigation measures include doubling up, and advertising for rooms in private homes.

Helena. Because of the proximity of Deer Lodge for commuting, Helena will experience less conflict with tourists during the summer season. However, the mitigation measures suggested under NTPR above are still appropriate.

Section 7D: Townsend to Roundup. See NTPR above.

Section 8D: Jordan to North Dakota Border. As under the NTPR, a serious lodging shortfall will occur along the length of section 8. The shortage amounts to 87,544 person-nights, seventy-one percent of the total demand. The impact on Jordan is identical to that of the NTPR. Circle is within commuting range of the pipeline from May through November and within range of pump station 7N/ western delivery facility. The impact in Circle, therefore, is expected to be greater than under the NTPR, while the impact on Poplar, Sidney, and Fairview is expected to be less. Despite the proximity of Circle, however, lodging shortfalls in the oil and gas boom areas are forecast from May through November. Mitigation measures include two construction camps along the pipeline route -- a major camp for 390 nonlocal workers and a smaller camp for the advance crew -- as well as a construction camp for nonlocal fixed-site workers.

Hi-Line Route

Sanders County. See NTPR above.

Missoula. See NTPR above.

Helena. Helena will experience a conflict for a shorter time under the Hi-Line Route than under the NTPR, but the time will still occur during the peak tourist season. See the mitigation measures suggested under NTPR above.

Great Falls. During April and May, about twenty-eight percent of Great Falls' motel rooms and RV/camper hookups would be occupied by nonlocal workers. For most of the life of the project, the occupancy rate will be much less. Competition with Canadian tourists for space therefore appears to be less serious than in other cities. Nevertheless, some advertising for sleeping rooms would be a prudent measure.

Havre. From June through October, Havre will experience a heavy influx of nonlocal workers, which, at the peak, could occupy nearly sixty percent of the city's motel rooms and RV/camper hookups. Havre is a fast-growing city; one of the reasons for its growth is Canadian trade, and the potential for competition is significant. Several options are available. Doubling up and advertising for rooms in private homes have been mentioned above. An attractive strategy is the expansion and construction of mobile home courts, since even permanent housing is tight in Havre. It may be possible to arrange for lodging at Northern Montana College dormitories during the summer. As the peak construction activity is only of three to four months duration, transient lodging options (rooms, college dorms, etc.) should be explored before encouraging investment in permanent facilities.

Section 8H: Chinook to Plentywood. Lodging shortfalls will occur in Harlem, Malta, and Saco in April, May, and June (27,377 person-nights, or sixty-five percent of total demand) and in Scobey and Plentywood in July through October (24,877 person-nights, or thirty-eight percent of total demand). A construction camp is clearly called for on both ends of section 8H -- a major camp capable of housing 385 workers. In addition, a smaller camp for the clearing and grubbing

crew of thirty workers would also be required from Valley County eastward to Plentywood. A construction camp would free lodging in Malta and Saco, as well as Glasgow, for fixed-site workers in pump station 6 near Saco, as well as for the western delivery facility/pump station near Plentywood.

Raynesford Route

Sanders County. See NTPR above.

Missoula. See NTPR above.

Helena. See Hi-Line Route above.

Great Falls. Great Falls will experience less lodging demand than under the Hi-Line Route. Of available transient lodging, twenty-nine percent would still be occupied by pipeline workers in April. See the mitigation measures suggested under Hi-Line Route above.

Section 7: Denton to Winnett. As pipeline construction moves out of commuting distance from Great Falls, a shortfall totaling 15,158 person-nights (twenty-nine percent of total demand) will occur in Denton, Lewistown, and Winnett during June through September. Two construction camps are necessary: a main camp for 386 workers, and a smaller camp for thirty advance workers. Lewistown contains 243 motel rooms and RV/camper hookups within commuting distance from May through August; a smaller camp might be an alternative mitigation strategy.

Section 8L: Jordan to North Dakota Border. See DNRC Modified Route above.

Knox Pass Route

Sanders and Mineral counties. During September, a lodging shortfall of 870 person-nights on section 4K is anticipated. Duration of the impact is short-term; appropriate mitigation measures include doubling up of nonlocal workers, and advertising for rooms in private homes. To avoid conflict with tourists, the expansion of RV/camper hookups in existing parks should be considered as well.

Missoula. As with the DNRC Modified Route, an overlap of nonlocal workers for sections 5K and 6K during May can be anticipated. The mitigation measures suggested under DNRC Modified Route, above, could alleviate the conflicts.

Arlee Route

Sanders and Lake counties. See Knox Pass Route above.

Missoula. See Knox Pass Route above.

St. Ignatius Route

Areas West of Helena. The lodging situation on the St. Ignatius Route is complicated because Missoula is not within commuting range to section 5S until August and to section 6S after March. Consequently, a significant lodging shortfall can be anticipated in Sanders and Lake counties. A serious shortage can be expected in Missoula and Powell counties (Seeley Lake and Drummond) due to section 6S workers. The serious lodging shortfall in Sanders and Lake counties will be on the order of 13,268 person-nights (48.6 percent of total demand) in June and July. Less serious shortfalls will occur in May (210 person-nights, or 1.3 percent of total demand) and in September (1,200 person-nights, or 8.2 percent of total demand). The lodging shortfall in Seeley Lake and Drummond is expected to total 19,087 person-nights (sixty-seven percent of total demand) in April and May.

A construction camp should be considered as a mitigation strategy. The shortfall will begin to occur in April, near Seeley Lake. A large construction camp, capable of holding 450 nonlocal workers, should be considered for section 6S from Seeley Lake till May, when nonlocal workers should be able to commute from Helena. Beginning in May, a serious lodging shortfall will take place on section 5S, near Plains in Sanders County. If it is feasible, the section 6S construction camp could be moved to the area near Plains, and used through September to avoid conflict with tourists in Missoula during August. If it is not feasible to move one construction camp from section 6S to section 5S in a relatively brief period, then two construction camps, each capable of housing 450 nonlocal workers, should be considered for both sections 5S and 6S.

The minor shortfalls in Sanders County during April and September can be mitigated by the measures suggested under NTPR above.

Helena. See NTPR above.

PUBLIC AND COMMERCIAL SERVICES AND FACILITIES

Most of the negligible impact in public and commercial services and facilities will be mitigated by measures taken in response to lodging impacts.

EDUCATION

The greatest impact is forecast to occur in Daniels, Granite, Meagher, Wheatland, and Garfield counties, where individual facilities may be pushed beyond capacity if attended by all school-age children who probably will accompany nonlocal workers. Each of these counties is traversed by a pipeline section where a construction camp is the appropriate mitigation strategy for lodging shortfalls. Workers' families cannot stay with them in construction camps and few workers are likely to stay outside of the camps, so it is highly improbable that enough nonlocal workers' children would be present to cause adverse impacts on educational services.

HEALTH

The greatest impact is forecast to take place in Meagher and Wheatland counties along the NTPR and DNRC Modified routes; in Phillips, Daniels, and Sheridan counties along the Hi-Line; in Garfield and McCone counties along the NTPR, DNRC Modified and Raynesford routes; and in Mineral County along the Knox Pass Route. In all these counties, emergency services are more than adequate and outpatient services will be most directly affected. In Garfield, Daniels, and Sheridan counties, acute-care services may also be affected.

Each county that has moderate or significant health services impacts is one in which a construction camp would alleviate lodging shortfalls. As noted above, an infirmary can be included among the services provided by construction camps and would mitigate the impact upon most outpatient services. In those counties where acute-care services may become inadequate, emergency ambulance services should be provided.

PUBLIC SAFETY

Little, if any, impact on public safety is expected. Interviews and research of available planning documents indicate that fire services in Havre are presently adequate. Pipeline construction does not normally represent a fire hazard. The greatest potential danger involves storage facilities. Common sense safety precautions regarding storage facilities, particularly in Havre, should suffice as a mitigation strategy.

RECREATION

Any potential conflict between tourist use in state and national forest campgrounds, and the possible use of these areas by nonlocal pipeline workers should be resolved by proper warnings by contractors and enforcement by campground supervisors. These facilities are for recreational use only, so pipeliners would be barred from staying there while working on the pipeline project.

COMMERCIAL AND OTHER SERVICES

No significant adverse impacts due to pipeline construction are expected for the commerical services sector.

The mitigation measure necessary to minimize adverse impacts on the highway system is to ensure that the construction contractor comply with all applicable highway construction standards.

SUMMARY

Because of the number of workers involved and the transient nature of pipeline construction activity, it will be possible to mitigate virtually all of the anticipated adverse socioeconomic impacts. In particular, the use of construction camps in the less populated areas of Montana would not only eliminate lodging problems, but also potential education impacts. The addition of infirmaries to such camps would do much to relieve any potential adverse impacts on health-care services.

In several locations, significant adverse impacts could be avoided or minimized with proper advance planning and execution of mitigation strategies. A good construction contractor, experienced in community relations and work force lodging problems, can be helpful to this process.

CHAPTER SIX

RECOMMENDATIONS FOR LONG-TERM MONITORING

Long-term monitoring of the socioeconomic impacts of the Northern Tier Project has two goals. The first is to provide an early warning of potential problems during the construction phase so that appropriate action may be initiated to solve them. The second is research-oriented and would accumulate primary data that will speed the evaluation and reduce the uncertainties in the socioeconomic assessment of similar projects in the future.

IMPACT MANAGEMENT

The management of socioeconomic impacts should be aimed at problem identification, avoidance, and solution. The area of particular concern is the transient lodging situation in Sanders, Lake, and Mineral counties, and the cities of Missoula, Helena, and Havre. It would be highly desirable to avoid a serious shortfall of lodging for tourists due to the presence of pipeline workers. The following steps are recommended:

1) Require from every construction prime contractor (for spreads and fixed-site facilities) an action plan for housing the pipeline workers. Such a plan might do no more than specify the use of construction camps, identify their probable locations, and list the permits required to set them up and operate them. Such a plan for Helena might consist of adding hookups to designated trailer courts of RV parks, an advertising campaign in the media for apartments and rooms to rent, the renovation of a dilapidated boarding house, the reservation of a limited number of motel rooms, and the establishment of a method for letting workers know of available lodging.

2) Review the feasibility of the plan.

3) Monitor the execution of the plan through status reports, checks with local authorities and interviews with motel and hotel owners.

4) Assist in obtaining local lodging, if necessary.

Other types of potential impacts which are less serious have been discussed above. It would be desirable to establish a communication network with county officials so that problems can be quickly reported, defined, and appropriately remedied. The basic process would be for complaints or indications of a particular problem to be directed to a designated person at DNRC who would then develop solutions with NTPC and their relevant contractor(s). County officials could function as the early warning devices in this system.

IMPACT RESEARCH

The NTPC Project would provide an ideal opportunity for DNRC to obtain valuable primary data regarding pipeline workers and community impact problems. Regarding pipeline workers, an economic/demographic profile could be developed through the use of a survey instrument similar to that used by Mountain West Research on other pipeline projects. Of particular interest would be information on the local/nonlocal composition of the work force by skill and union affiliation. In addition, age/sex, family characteristics, expenditure patterns, and lodging preferences and locations would be valuable. The collection and analysis of such information would not be costly.

At the community impact level, the effect of a large nonlocal temporary work force on communities of less than 2,000 persons has not been analyzed. Moreover, the economic impact of pipeline projects on local communities needs to be investigated and quantified. In particular, evidence of induced short-term employment is lacking. The NTPS Project would provide an excellent opportunity to fill the above-mentioned research needs and provide a sound basis for the future evaluation of similar projects.

Finally, it would be worthwhile to track the effect of NTPC property tax payments on local tax rates and public expenditures, to use as a guide for future calculations.

APPENDIX

CONSTRUCTION SCHEDULE PARAMETERS

NTPR

Section 4

1) Work force = 440 + 10 inspectors + 13 radiographic technicians

2) Length = 165.7 kilometers (103 miles): 123.6 km in Idaho and 42.1 km in Montana

3) Assumptions

   A) Average rate of construction = 4.7 km/wk

   B) Average length of spread (including clearing and grubbing) = 13 km

   C) Clearing and grubbing crew stays with construction crew throughout construction

   D) Construction period 3/1/80 - 10/31/80

   E) Construction start-up 2/1/80 - 2/28/80

   F) Construction wrap-up 11/1/80 - 11/28/80

4) Construction spread reaches Montana border 76.9 ÷ 2.94 = 26 wk after start-up or on 8/31/80

Section 5

1) Work force = 440 + 10 inspectors + 13 radiographic technicians

2) Length = 159.2 km (98.9 mi)

3) Assumptions

   A) Average rate of construction = 4.5 km/wk

   B) Average length of spread = 13 km

   C) Clearing and grubbing crew stays with construction crew throughout construction

   D) Construction period 3/1/80 - 10/31/80

   E) Construction start-up 2/1/80 - 2/28/80

   F) Construction wrap-up 11/1/80 - 11/28/80

Section 6

1) Work force = 440 + 10 inspectors + 13 radiographic technicians

2) Length = 188.7 km (117.2 mi)

3) Assumptions

A) Average rate of construction = 5.4 km/wk

B) Average length of spread = 13 km

C) Clearing and grubbing crew (as on Sections 4 and 5)

D) Construction period 3/1/80 - 10/31/80

E) Construction start-up 2/1/80 - 2/28/80

F) Construction wrap-up 11/1/80 - 11/28/80

Section 7

1) Work force = 440 + 10 inspectors + 13 radiographic technicians

2) Length = 295.4 km (183.5 mi)

3) Assumptions

A) Average rate of construction = 7.2 km/wk first 113 km
9.3 km/wk remaining 182.4 km

B) Average length of spread = 16 km

C) Clearing and grubbing crew (33 persons) stays with construction crew through 5/31/80 and thereafter moves ahead twice as fast (Note: by 5/31/80 crew would be at Martinsdale), finishing on 8/1/80

D) Construction period 3/1/80 - 10/31/80

E) Construction start-up 2/1/80 - 2/28/80

F) Construction wrap-up 11/1/80 - 11/28/80

Section 8

1) Work force = 400 + 10 inspectors + 13 radiographic technicians

2) Length= 328.4 km (204 mi) (Note: This is the length to the North Dakota border; for labor reasons, it is likely that the actual construction section will extend to the border.)

3) Assumptions

A) Average rate of construction = 9.4 km/wk

B) Average length of spread = 16 km

C) Clearing and grubbing crew (30 persons) stays with the main body of the work force through 4/1/80 thereafter it moves on ahead, completing its activities by 7/2/80

D) Construction period 3/1/80 - 10/31/80

E) Construction start-up 2/1/80 - 2/28/80

F) Construction wrap-up 11/1/80 - 11/28/80

HI-LINE ROUTE

Section 4

See NTPR

Section 5

See NTPR

Section 6H

1) Work force = 440 + 10 inspectors + 13 radiographers

2) Length = 187.4 km (116.5 mi)

3) Assumptions

A) Average rate of construction = 5.4 km/wk

B) Average length of spread = 13 km

C) Clearing and grubbing crew stays with construction crew throughout construction

D) Construction period 3/1/80 - 10/31/80

E) Construction start-up 2/1/80 - 2/28/80

F) Construction wrap-up 11/1/80 - 11/28/80

Section 7H

1) Work force = 400 + 10 inspectors + 13 radiographers

2) Length = 270.3 km (168 mi)

3) Assumptions

A) Average rate of construction = 7.7 km/wk

B) Average length of spread = 16 km

C) Clearing and grubbing crew (30 persons) stays with construction crew through 4/15/80 thereafter, it moves on ahead, completing its activities by 7/2/80

D) Construction period 3/1/80 - 10/31/80

E) Construction start-up 2/1/80 - 2/28/80

F) Construction wrap-up 11/1/80 - 11/28/80

Section 8H

1) Work force = 400 + 10 inspectors + 13 radiographers

2) Length = 362 km (224.9 mi)

3) Assumptions

A) Average rate of construction = 10.3 km/wk

B) Average length of spread = 16 km

C) Clearing and grubbing crew stays with main body of the work force through 4/7/80; thereafter, it moves on ahead, completing its activities by 7/2/80

D) Construction period 3/1/80 - 10/31/80

E) Construction start-up 2/1/80 - 2/28/80

F) Construction wrap-up 11/1/80 - 11/28/80

RAYNESFORD ROUTE

Section 4

See NTPR

Section 5

See NTPR

Section 6

See Hi-Line Route

Section 7

1) Work force = 400 + 10 inspectors + 13 radiographic technicians

2) Length = 284.2 km (176 mi)

3) Assumptions

   A) Average rate of construction = 8.1 km/wk

   B) Average length of spread = 16 km

   C) Clearing and grubbing crew stays with main body of work force through 4/7/80; thereafter, it moves on ahead, completing its activities by 7/2/80

   D) As on Hi-Line Section 7

   E) As on Hi-Line Section 7

   F) As on Hi-Line Section 7

Section 8

See NTPR

LITERATURE CITATIONS

Carroll College. 1979. Personal communication with the Dean of Students.

Chalmers, J. A., Anderson, E. J., Beckhelm, T., Harrigan, W. 1977. An Empirical Model of Spatial Interaction in Sparsely Populated Regions. 24th North American Meeting of the Regional Science Assn., Philadelphia, Pa. November 11-13.

Elder International. 1979. Joe C. Liles personal communication. March 6, 1979.

Flint Engineering. 1979. Personal communication. Billings, Montana.

Green Construction Company. 1978. Clark Besalk. Personal communication. Des Moines, Iowa.

International Association of Assessing Officers. 1975. Demonstration Appraisal; Natural Gas Pipeline System, Chicago, Illinois. 1975.

Leahy, J. F. 1978. Hotel/Motel Guide and Travel Atlas. 103rd Edition. American Hotel Register Company, Northbrook, Illinois.

Montana Department of Community Affairs. 1979. Dave Cole.

Montana Department of Highways. 1978. Planning and Research Division. Traffic by Section; Montana 1977. Helena, Montana.

Montana Department of Revenue. 1979. Ken Morrison and John Clark. Personal communication, January and February 1979.

Mulraney and Jim Richards. Personal communication.

Montana Taxpayers Association. 1978a. Property taxes imposed by school districts for 1977-78, 1978-79. Helena, Montana.

_____. 1979. Montana property tax mill levies 1978-79. Helena, Montana.

Mountain West Research, Inc. 1976. Construction worker profile. Prepared for the Old West Regional Commission. Rapid City, South Dakota.

_____. 1979. Pipeline construction worker and community impact surveys. Prepared for DNRC. Final report, Billings, Montana.

Northern Tier Pipeline Company. 1978a. Description of the proposed action. Prepared for NTPC by Butler and Associates. Submitted to the Bureau of Land Management. May 1978.

_____. 1978b. Letter to the BLM dated February 13, 1978.

_____. 1978c. Personal communication. September 1978.

_____. 1978d. Personal communication. October 1978.

_____. 1978e. Northern Tier Pipeline system construction manpower requirements and schedules for Montana pipeline facilities.

_____. 1979a. Personal communication. May 25, 1979.

_____. 1979b. Letters of February 2 and February 19, 1979.

Natural Pipeline Company. 1978. Roger van Beldhiugen. Personal communication. Lakeville, Minn.

Reading and Bates Construction. 1978. Personal communication. Houston, Texas.

U.S. Department of Commerce. 1974a. Current population reports. Series 25, Number 674. Washington, D.C. U.S. Government Printing Office. May 1974.

_____. 1974b. Current population reports. Series 25, Number 734. Washington, D.C. U.S. Government Printing Office. May 1974.

_____. 1977. Employment by type and broad industrial sources 1971-1976. Montana counties. Computer printouts.

U.S. Department of Energy. 1978. Socioeconomic impact assessment, A methodology applied to synthetic fuels. Murphy-Williams Urban Planning and Housing Consultants. Washington, D.C.

U.S. Department of the Interior. 1977. Bureau of Reclamation. Construction worker survey. Prepared by Mountain West Research, Inc.

_____. 1979. Bureau of Land Management: draft environmental statement, crude oil transportation system, Port Angeles, Washington to Clearbrook, Minnesota as proposed by Northern Tier Pipeline Company, January 3, 1979.

Western Coal Planning Assistance Project. 1979. April 23rd. Stan Steadman personal communication.

Wieland, J.S., Leistritz, F.L., and Murdock, S.H. 1977. Regional operating worker profile: North Dakota, Montana, and Wyoming. North Dakota State University. 1977.

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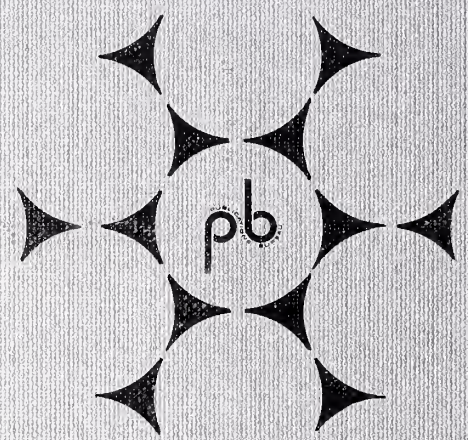

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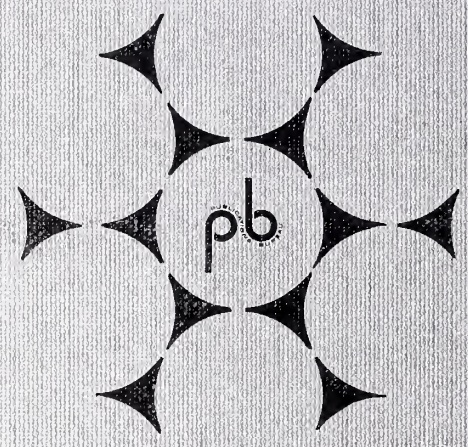

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